

227240

JUN 1 2010
RECEIVED

**BEFORE THE
SURFACE TRANSPORTATION BOARD**

ARKANSAS ELECTRIC COOPERATIVE)
CORPORATION – PETITION FOR)
DECLARATORY ORDER)

Finance Docket No. 35305

**REBUTTAL EVIDENCE AND ARGUMENT
OF WESTERN COAL TRAFFIC LEAGUE
AND CONCERNED CAPTIVE COAL SHIPPERS**

ENTERED
Office of Proceedings

JUN 7 - 2010

Part of
Public Record

REDACTED, PUBLIC VERSION
MATERIAL UNDER SEAL DELETED

C. Michael Loftus
Christopher A. Mills
Frank J. Pergolizzi
Andrew B. Kolesar III
Slover & Loftus LLP
1224 Seventeenth St., N.W.
Washington, D.C. 20036
(202) 347-7170

*Attorneys for Concerned Captive
Coal Shippers*

William L. Slover
John H. LeSeur
Peter A. Pfohl
Slover & Loftus LLP
1224 Seventeenth St., N.W.
Washington, D.C. 20036
(202) 347-7170

*Attorneys for Western Coal
Traffic League*

Dated: June 4, 2010

**BEFORE THE
SURFACE TRANSPORTATION BOARD**

ARKANSAS ELECTRIC COOPERATIVE)	
CORPORATION – PETITION FOR)	
DECLARATORY ORDER)	
)	

Finance Docket No. 35305

**REBUTTAL EVIDENCE AND ARGUMENT
OF WESTERN COAL TRAFFIC LEAGUE
AND CONCERNED CAPTIVE COAL SHIPPERS**

REDACTED, PUBLIC VERSION
MATERIAL UNDER SEAL DELETED

C. Michael Loftus
Christopher A. Mills
Frank J. Pergolizzi
Andrew B. Kolesar III
Slover & Loftus LLP
1224 Seventeenth St., N.W.
Washington, D.C. 20036
(202) 347-7170

*Attorneys for Concerned Captive
Coal Shippers*

William L. Slover
John H. LeSeur
Peter A. Pfohl
Slover & Loftus LLP
1224 Seventeenth St., N.W.
Washington, D.C. 20036
(202) 347-7170

*Attorneys for Western Coal
Traffic League*

Dated: June 4, 2010

TABLE OF CONTENTS

	<u>Page</u>
SUMMARY	1
ARGUMENT	8
I. IN DETERMINING WHETHER BNSF’S COAL DUST TARIFF ITEMS CONSTITUTE AN UNREASONABLE PRACTICE, THE BOARD IS CHARGED WITH PROTECTING THE PUBLIC INTEREST	8
II. BNSF’S INTEREST HERE IS SOLELY FINANCIAL – IT WANTS TO LOWER ITS MAINTENANCE COSTS AT THE EXPENSE OF THE SHIPPING PUBLIC.....	10
A. The Coal Dust Tariff Items Are Not Needed To Protect The Integrity of the “Coal Supply Chain”	11
B. The Coal Dust Tariff Items Are Not Needed to Ensure Efficient Operations	15
C. The Law Does Not Support BNSF’s Promulgation of the Coal Dust Tariff Items	17
D. BNSF Could Enter Into Arrangements Where it Agrees to Pay Some or All Coal Spraying Costs, but it Refuses to Do So.....	23
E. BNSF’s Real Interests in this Case are Financial Ones	24
III. BNSF’S FIXATION ON COAL DUST IS ARBITRARY	25
A. BNSF Has Not Prepared Field Studies Identifying the Scope of Coal Dust Fouling on the Joint Line and the Black Hills Line	26
B. BNSF Has Not Prepared Field Studies Identifying How Much Coal Dust Contributes to Actual Ballast Fouling on the Joint Line and the Black Hills Line	27

C.	BNSF Has Not Shown that “Large” Amounts of Coal are Coming Out of the Tops of Rail Cars, and that “Negligible” Amounts of Coal are Coming Out of the Bottoms of Rail Cars.....	28
IV.	BNSF’S PROPOSED IDV STANDARDS ARE UNREASONABLE BECAUSE THEY ARE ABITRARY AND NOT SUPPORTED BY SOUND SCIENCE.....	30
A.	BNSF Concedes, as it Must, that its E-Samplers are Not Measuring Materials Deposited in Track Ballast.....	32
B.	BNSF Has Not Demonstrated, Using Sound Science, that its E-Samplers are Measuring Only Coal Dust.....	34
C.	The E-Sampler Output BNSF is Using is Not Accurately Measuring Particulate Emissions.....	36
D.	BNSF’s Own Field Tests Confirm that its E-Samplers are Not Making Accurate Measurements of Particulates	43
E.	Neither Coal Shippers, Nor the Board, Can Evaluate BNSF’s IDV.2 Standards Unless BNSF Turns Over the Computer Program Used to Develop and Implement the Standards, Which BNSF Refuses to Do.....	45
F.	The Statistical Analysis BNSF Used to Derive the IDV.2 Train Limits is Fatally Flawed	46
G.	BNSF’S Use of E-Samplers, and its Development of the IDV.2 Standards, Should be Peer Reviewed.....	48
V.	BNSF’S PROPOSED COAL DUST TARIFF ITEMS ARE UNREASONABLE BECAUSE COMPLIANCE COSTS EXCEED BY A WIDE MARGIN THE COSTS OF CONTINUING TO ADDRESS COAL DUST THROUGH TRADITIONAL MAINTENANCE TECHNIQUES	50
A.	Incremental Maintenance Costs Associated with Coal Dust	53
B.	Costs of Applying Surfactants	56

VI.	BNSF'S PROPOSED COAL DUST TARIFF ITEMS ARE UNREASONABLE BECAUSE THERE ARE NO PROVEN COMPLIANCE METHODOLOGIES	59
VII.	BNSF'S PROPOSED COAL DUST TARIFF ITEMS ARE UNREASONABLE BECAUSE SHIPPERS WILL BE FORCED TO PAY TWICE OR THREE TIMES FOR THE SAME MAINTENANCE COSTS	61
VIII.	BNSF'S PROPOSED TRAIN PROFILING STANDARDS ARE UNREASONABLE.....	65
IX.	BNSF'S PROPOSED COAL DUST TARIFF ITEMS ARE UNREASONABLE BECAUSE BNSF HAS NOT PUBLISHED ITS PROPOSED ENFORCEMENT PROCEDURES AND PENALTIES.....	66
X.	IF THE COAL DUST TARIFF ITEMS ARE APPROVED, BNSF MUST REIMBURSE COAL SHIPPERS FOR THEIR REASONABLY INCURRED COMPLIANCE COSTS.....	69
XI.	IF THE COAL DUST TARIFF ITEMS ARE APPROVED, THE BOARD SHOULD RULE THAT BNSF MAY NOT DENY SERVICE FOR FAILURE TO COMPLY WITH THESE ITEMS	72
XII.	IF THE COAL DUST TARIFF ITEMS ARE APPROVED, THE BOARD SHOULD FIND THAT THESE ITEMS, AND BNSF'S CORRESPONDING JOINT LINE OPERATING RULES, DO NOT APPLY TO UP OR TO UP COAL SHIPPERS.....	75
	CONCLUSION	76

Argument

1. 2. 3.

4. 5.

6. 7. 8. 9. 10.

11. 12. 13.

14.

15.

**BEFORE THE
SURFACE TRANSPORTATION BOARD**

ARKANSAS ELECTRIC COOPERATIVE)	
CORPORATION – PETITION FOR)	
DECLARATORY ORDER)	Finance Docket No. 35305
)	

**REBUTTAL EVIDENCE AND ARGUMENT
OF WESTERN COAL TRAFFIC LEAGUE
AND CONCERNED CAPTIVE COAL SHIPPERS**

The Western Coal Traffic League and Concerned Captive Coal Shippers (collectively “Coal Shippers”) present the following rebuttal evidence and argument.

SUMMARY

Coal Shippers continue to request that the Board find that BNSF Railway Company’s (“BNSF”) proposed Coal Dust Tariff Items¹ are unreasonable and that publication of these Items constitutes an unreasonable practice. Alternatively, if the Board approves the Coal Dust Tariff Items, Coal Shippers request that the Board order BNSF to pay its coal shippers reasonable allowances for the costs they incur in complying with the Coal Dust Tariff Items, that the Board direct BNSF that it may not deny service to coal shippers for failure to comply with the Coal Dust Tariff Items, and that the Board hold that the Coal Dust Tariff Items have no direct or indirect application to Union Pacific Railroad Company (“UP”) coal shippers.

¹ BNSF Price List 6041-B, Items 100 and 101 (collectively “Coal Dust Tariff Items”).

Coal Shippers ask the Board to grant the relief they request for the reasons set forth in their opening and reply filings, as well as the reasons set forth in this rebuttal filing, which are summarized below:

- BNSF argues that the Board's role in this proceeding is simply to determine whether publication of the Coal Dust Tariff Items is in BNSF's best interests. That is not the proper legal standard. The Board is called upon in this proceeding to determine whether the Coal Dust Tariff Items are reasonable from the broader public perspective, which calls upon the Board to balance the interests of shippers, carriers and the general public interest.

- Coal Shippers submit that BNSF wants to publish the Coal Dust Tariff Items solely to reduce its current maintenance costs. However, BNSF refuses to admit this purpose. Instead, BNSF claims that its interests lie in protecting the "coal supply chain," in ensuring "efficient" rail operations, in enforcing alleged legal standards that, they assert, require coal shippers to "keep the coal in their cars," and for other assorted purposes. The Board should give no credence to these diversionary tactics. The current coal supply chain is fully protected today so long as BNSF properly maintains its railroad; Powder River Basin ("PRB") coal shipments are moving very efficiently today; the law requires only that coal shippers safely load their cars, which they are doing today; and contrary to BNSF's and UP's current assertions, the May 2005 derailments on the PRB Joint Line were the product of poor maintenance practices, not some unforeseen and unforeseeable problem that could reoccur without warning in the future.

- BNSF claims that it cannot act on its own to spray or profile coal cars to reduce coal dust emissions. That's complete nonsense. Prior to the institution of this proceeding, shippers, carriers, and PRB mine operators worked cooperatively to put in place train profiling loading chutes at PRB mines. BNSF is also free to work with shippers, and coal companies, to produce similar arrangements involving coal train spraying. However, it is clear that BNSF does not want to work cooperatively. Instead, it wants coal shippers to bear all the costs of train spraying and also wants to penalize shippers who are attempting in good faith to work with their mines to use train profile loading chutes.

- In pursuit of its regulatory objectives, BNSF has arbitrarily fixated on coal dust and attempted to inflate an ordinary maintenance issue into a non-existent crisis. Coal Shippers do not dispute that coal dust comes out of some rail cars, that coal dust, along with other contaminants, fouls rail ballast, or that rail ballast must be properly maintained to address these contaminants. However, it is also clear that BNSF has done no studies that demonstrate such basic things as how much ballast is fouled on its PRB lines and how much of that fouling is caused by coal dust. BNSF has no incentive to do so since the Coal Dust Tariff Items, if permitted to go into effect, will place all compliance costs on coal shippers.

- In the absence of credible studies, BNSF resorts to show-and-tell tactics, including pictures of blackened ballast and trains emitting plumes of dust. Of course, some trains emit dust and some ballast is black (though coal dust may only be a small fraction of the blackened ballast). But much of the ballast on the PRB lines looks

fine, and most trains, when viewed, are not emitting dust. Since BNSF has larded the record with pictures and videos showing blackened ballast and dust emitting trains, Coal Shippers present their own pictures and videos showing clean PRB ballast and non-dusting trains. See Counsel's Rebuttal Exhibits 1 and 2.

- BNSF's Coal Dust Tariff Items contain standards that require coal shippers' trains passing BNSF's "E-Samplers" at Milepost ("MP") 90.7 on the Joint Line and MP 558.2 on the Black Hills Line to possess "Integrated Dust Values" ("IDV" or "IDV.2") less than 300 "dust units" on the Joint Line and 245 "dust units" on the Black Hills Line. BNSF claims that its IDV standards are based on "painstaking scientific and engineering research" supported by data collected from "thousands of trains." In fact, as Coal Shippers demonstrate, there is no credible "science" behind BNSF's E-Sampler/IDV methodology and while "thousands of trains" have IDV values, the maximum IDV train limits are based on studies of only a handful of qualifying trains. The bottom line here is that BNSF's E-Sampler/IDV standards are completely arbitrary because, among other reasons, the E-Sampler output data (voltages) are not accurately measuring particulate emissions from passing trains, nor has BNSF provided the secret "black box" program it uses to turn the inaccurate E-Sampler inputs into the "IDV" values it uses to rank trains for "dustiness."

- BNSF's E-Sampler/IDV standards are air emission standards. These types of standards are usually issued by regulatory agencies that have expertise in air monitoring issues, such as the Environmental Protection Agency ("EPA"). Even EPA finds these issues daunting, and routinely seeks expert peer review of proposed emission

standards before approving them in order to make sure the standards are supported by sound science. If the Board is going to be thrust into air emissions regulation, Coal Shippers strongly suggest that it seek input from experts in the field, particularly before permitting a carrier to use a new standard to place huge financial burdens on shippers.

- Even if the IDV standards were not completely arbitrary, which they are, the Board should not permit BNSF to adopt them because the cost to the shipping public of complying with these standards is far greater than the maintenance cost savings to BNSF. The best evidence of record shows that the annual costs to coal shippers using the Joint Line to comply with the IDV standards by train spraying ranges between {
} whereas the maintenance cost savings associated with the spraying ranges between {
}. It is clearly unreasonable, and contrary to the public interest, for shippers to be forced to incur IDV compliance costs that vastly exceed the maintenance cost savings for BNSF.

- Coal Shippers are unaware of any proven methods to comply with BNSF's proposed IDV standards. Coal Shippers believe that BNSF expects shippers to try to comply with the IDV standards using train profiling and train spraying. However, Coal Shippers are not aware that there exists today any proven profiling/spraying approach that guarantees compliance with BNSF's proposed standards. It is clearly unreasonable for BNSF to publish a tariff where there are no known, guaranteed methods to comply.

- BNSF coal shippers currently pay BNSF for maintenance costs as part of their freight rates. BNSF has stipulated to this fact. Requiring coal shippers to

pay to spray their coal, and to profile their coal cars, will result in shippers paying twice for the same service – once as part of their rates and a second time in paying to spray or profile cars. Coal shippers could be forced to triple pay if BNSF also imposes penalty charges for a shipper's failure to comply with the Coal Dust Tariff Items, even if its trains are sprayed and profiled.

- BNSF has not yet published the procedures it plans to apply to enforce the Coal Dust Tariff Items. This failure itself constitutes an unreasonable practice because the law requires carriers to set forth all consequential tariff items in writing. Moreover, neither the Board, nor the public, can understand what the Coal Dust Tariff Items mean without first seeing the proposed enforcement procedures in writing. As Coal Shippers noted in their reply evidence, material in BNSF's highly confidential exhibits indicates that BNSF {

}. Coal Shippers request that the Board order BNSF to publish its enforcement procedures, and permit supplemental public comment on them, before taking any final actions in this proceeding.

- If the Board decides to approve the Coal Dust Tariff Items, Coal Shippers request that the Board also order BNSF to publish a corresponding allowance tariff, direct that BNSF cannot stop train service if a shipper fails to comply with the Items, and hold that the Coal Dust Tariff Items are not applicable to UP or to UP coal shippers. BNSF should pay allowances because, among other reasons, its coal shippers

are already paying for coal dust-related maintenance costs as part of their freight rates. The Board should find that BNSF cannot stop train service for any violations of the Coal Dust Tariff Items because shutting off service under these circumstances would violate BNSF's statutory common carrier obligation to provide service. The Board should hold that the Coal Dust Tariff Items do not apply to UP shippers because they are not customers of BNSF, nor does BNSF provide them with common carrier service.

Coal Shippers' rebuttal is supported by verified statements submitted by the following witnesses –

- Richard H. McDonald – Mr. McDonald demonstrates that BNSF and UP can properly maintain their rail operations in a safe and efficient manner if they properly deploy current maintenance practices. He also demonstrates that the derailments on the Joint Line in May of 2005 were the results of poor pre-derailment maintenance and inspection practices.
- Paul R. Reistrup – Mr. Reistrup demonstrates that rail industry practice has been to accept all safely loaded shipments for transportation, including the acceptance of freight in open top cars that “dust” along their routes of movement.
- Dr. Mark J. Viz, Ph.D., P.E. – Dr. Viz demonstrates that BNSF's proposed use of E-Samplers, and its proposed IDV standards, are arbitrary and not based on sound science.
- Dr. Gary M. Andrew – Dr. Andrew demonstrates that the statistical analyses BNSF used to develop its IDV train standards are fatally flawed.

- Thomas D. Crowley – Mr. Crowley demonstrates that the costs to shippers of complying with the Coal Dust Tariff Items substantially exceed the benefits to BNSF in terms of reduced maintenance costs. Mr. Crowley also responds to other claims made by BNSF and UP and further demonstrates, among other things, that BNSF's and UP's PRB coal traffic is highly profitable.

ARGUMENT

I.

IN DETERMINING WHETHER BNSF'S COAL DUST TARIFF ITEMS CONSTITUTE AN UNREASONABLE PRACTICE, THE BOARD IS CHARGED WITH PROTECTING THE PUBLIC INTEREST

In its Opening Evidence and Argument ("BNSF Op."), BNSF argued that the Board's "reasonableness inquiry" in this proceeding was limited to a determination of whether BNSF had a "rational basis" for proposing and adopting the Coal Dust Tariff Items. *Id.* at 20. BNSF repeats this argument in its Reply Evidence and Argument ("BNSF Reply"). *See* BNSF Reply at 4 ("[t]he Board is not establishing coal dust standards").

BNSF's contentions are wrong. The Board's role in this proceeding is not to determine whether BNSF has a "rational basis" for proposing the Coal Dust Tariff Items. Clearly, BNSF's interest in proposing the Coal Dust Tariff Items is to reduce its maintenance costs by forcing coal shippers to pay to spray coal trains. While it may be "rational" for BNSF to want to reduce its costs, and add to the costs of its coal shippers,

the Board's inquiry here is not limited to determining whether adoption of the proposed Coal Dust Tariff Items is in BNSF's best interests.

Instead, as Coal Shippers pointed out in their Reply Evidence and Argument ("Coal Shippers Reply"), the Board's duty here is to determine whether BNSF's proposed promulgation of the Coal Dust Tariff Items is in the public interest. *See id.* at 28 n.25 (noting that the Board is "the guardian of the general public interest") (citation omitted). Any doubts concerning the Board's role here were put to rest years ago by the United States Court of Appeals for the District of Columbia Circuit in *Consolidated Rail Corp. v. ICC*, 646 F.2d 642 (D.C. Cir. 1981) ("*Conrail*").

In *Conrail*, the Interstate Commerce Commission ("ICC" or "Commission") rejected tariffs proposed by eastern railroads that required transportation of hazardous radioactive materials in "special train service" ("STS"). In the ensuing judicial review proceedings, the eastern railroads "argued to [the Court of Appeals] that the Commission lacks authority to second-guess the railroads 'rational judgment' on an 'operational' issue such as the need for STS." *Id.* at 646.

The D.C. Circuit summarily rejected the eastern railroads' contentions, holding that the Commission's role is to determine whether rates and practices are reasonable from the "*public perspective*":

Because it is the Commission's statutory responsibility to ensure that the rates and practices subject to its jurisdiction are 'reasonable,' petitioners' argument that 'the Commission may not disregard the railroads' rational judgment that special train service be used,' must fail The question is not whether the decision to use STS can be described as 'rational' from the railroads' perspective, but instead whether the

practice and the tariff based on it is *reasonable* when viewed from the *public* perspective of the Commission, which must reconcile a multitude of factors in exercising its judgment on tariff issues

Id. at 647 (emphasis added).²

Coal Shippers are not alone in their rejection of BNSF's proposed standard of review. The Department of Transportation ("DOT") rejects it as well. *See* DOT Reply at 6 ("[t]he tariff rule must be more than 'rational' from the railroad's perspective" to be found to constitute a reasonable practice). When the broader public interest is considered, it is clear that the Board must find that BNSF's Coal Dust Tariff Items are unreasonable, and their promulgation by BNSF is an unreasonable practice.

II.

BNSF'S INTEREST HERE IS SOLELY FINANCIAL – IT WANTS TO LOWER ITS MAINTENANCE COSTS AT THE EXPENSE OF THE SHIPPING PUBLIC

BNSF has filed extensive opening and reply comments in this proceeding. Not surprisingly, BNSF has not admitted in any of these submissions what its true interests are in this proceeding. BNSF wants to reduce its maintenance costs by requiring shippers to spray their trains to reduce coal dust emissions. This approach is a no-brainer for BNSF management – BNSF obtains all of the projected benefits (reductions in maintenance costs) while shippers bear all of the compliance costs.

² The court also noted that "Long ago the Supreme Court made it clear that 'no party has a right to insist upon a wasteful or excessive service for which the consumer must ultimately pay.' *Atchison Railway Co. v. United States*, 232 U.S. 199, 217 . . . (1914)." *Id.*

Rather than admit its true motivations, BNSF engages in misdirection. Its opening and reply filings assert that its Coal Dust Tariff Items are justified for a bevy of reasons that have nothing to do with the financial benefits it expects to reap by shifting maintenance costs to shippers. None of these asserted rationales is correct, and the Board should take care not to give them any credence.

A. The Coal Dust Tariff Items are Not Needed to Protect the Integrity of the “Coal Supply Chain”

BNSF believes that if it throws enough adjectives around, it can transform business as usual on its coal lines into a crisis brought on by coal dust. At every turn in its filings, BNSF’s counsel and its witnesses claim that coal dust is “pernicious” and its existence presents a “serious risk to the integrity of the coal supply chain.” *See, e.g.*, BNSF Reply at 2, 24. UP’s filings contain page after page of similar claims of the “danger[s]” assertedly caused by coal dust. *See, e.g.*, UP Reply at 3, 2 (coal dust is a “particularly dangerous” ballast foulant that poses “a real threat to safe and reliable transportation”).

BNSF’s and UP’s claims mirror those raised by carriers in other cases involving rail practices. Railroads frequently have asserted that the ICC, or the STB, should rubber-stamp their management decisions on grounds that these decisions are rooted in safety concerns, and any attempts by regulators to second-guess these decisions could lead to catastrophic results. However, the ICC and the STB have properly resisted such carrier scare tactics when the railroads’ safety assertions were not supported by the evidence of record.

For example, the STB recently rejected claims made by UP that it was too unsafe for the carrier to transport hazardous chemicals. *See Union Pacific Railroad Co. – Petition for Declaratory Order*, STB Finance Docket No. 35219 (STB served June 11, 2009). Similarly, the ICC rejected claims made by many of the nation’s railroads that it was not safe to transport nuclear waste in regular train service. *See Radioactive Materials, Special Train Service, Nationwide*, 359 I.C.C. 70 (1978). In each case, the agency found that the record did not support the carriers’ safety assertions. The facts in this case compel the Board to reach the same conclusion:

- **Safety Record After May 2005** – BNSF’s and UP’s claims concerning threats to the integrity of the “coal supply chain” caused by coal dust find no support whatsoever in terms of what is actually occurring on their coal lines. Neither carrier points to a single incident or accident since 2005 that it asserts was caused by a coal dust-related maintenance problem. The fact of the matter is that there has not been a single event on BNSF’s or UP’s line since the May 2005 derailments where the supply chain has been threatened, much less impacted, by any ballast maintenance issues due in whole or in part to ballast fouling caused by coal dust or other ballast contaminants.

- **May 2005 Derailments** – BNSF and UP claim that the two derailments in May of 2005 on the Joint Line provide examples of how the coal supply chain can be disrupted by derailments related to coal dust. However, the record in this case demonstrates that the two 2005 derailments were the direct product of insufficient maintenance and inspection of the Joint Line prior to the derailments. BNSF and UP witnesses attempt to rewrite history by claiming that the two derailments were not the

direct product of poor maintenance practices, {

} *See* Coal Shippers Op. at

14-17 and Appendix B; Coal Shippers Reply at 6-8; Counsel's Rebuttal Exhibit 3.

BNSF and UP now argue that the Board need not try to determine what caused the 2005 derailments. BNSF refers to the issue as a "red herring" and asserts that "BNSF has not claimed that coal dust was the sole cause of the 2005 derailments." BNSF Reply at 14. Similarly, UP now asserts that "[a]ttempts to prove that two derailments five years in the past were caused by defective design or deferred maintenance are irrelevant." UP Reply at 13.

BNSF cited the 2005 derailments as the leading examples of why the Board should approve its Coal Dust Tariff Items. *See, e.g.*, BNSF Op. at 9-11, 21; Fox V.S. at 4-6; VanHook V.S. at 3-4. If, as it appears, BNSF and UP are now backing away from these claims, Coal Shippers agree that the Board need not determine the cause of these derailments – even though the cause is obvious. However, BNSF and UP cannot have it both ways. They cannot cite the 2005 derailments in support of the Coal Dust Tariff

Items and then turn around and say that the cause of these derailments is a “red herring” or “irrelevant.”

- **Current Maintenance Practices** – BNSF and UP speculate that even if current maintenance practices have been sufficient to protect the “coal supply chain,” these practices will not be sufficient to protect the supply chain in the future. The only reason BNSF and UP put forward for this startling assertion is their claim that in some locations along their coal lines, coal dust is difficult to see or detect. *See, e.g.,* BNSF Reply at 3,13; Sloggett Reply V.S. at 10; UP Reply at 6-7. If this is true, then it has always been the case, and the carriers have had no problems since 2005 properly maintaining their lines.

Moreover, as Coal Shippers’ witness McDonald points out, the railroads’ claim that they cannot determine when and where to maintain their lines is the true “red herring.” BNSF and UP have been maintaining their PRB coal line network for decades and know how to do so. McDonald Reb. V.S. at 6-7. Clearly, BNSF and UP can continue to maintain their coal lines to provide safe coal service that protects the “coal supply chain.” They simply want to change their current procedures to require train spraying because it lowers their maintenance costs. Financial reasons, not safety reasons, are driving BNSF’s and UP’s management goals and objectives here.

DOT’s Reply Comments support these conclusions. In their Reply Comments, DOT asserts that BNSF and UP are required under FRA rules to maintain their ballast to support safe railroad operations. *Id.* at 3 (citing 49 C.F.R. § 213.103). DOT also asserts that BNSF and UP are permitted to meet these obligations using any

method that does not “violate applicable regulations or otherwise threaten safety.” *Id.* at

4. Significantly, DOT acknowledges that BNSF’s and UP’s use of current ballast maintenance practices, without the added requirement of spraying coal trains, is perfectly permissible because these practices do not “violate applicable regulations or otherwise threaten safety.” *Id.*

If BNSF and UP really believed that they could not operate their railroads in a safe manner using current maintenance practices, they would have a legal (as well as a moral) obligation to inform the FRA, the agency that regulates rail safety. Similarly, FRA would have a legal and ethical obligation to promulgate rules necessary to protect the shipping public. Of course, BNSF and UP have not taken this matter to FRA, because both carriers obviously believe that they can operate their railroads safely without requiring that rail cars be sprayed for coal dust. Both carriers simply prefer, for financial reasons, to require their coal shippers to spray their cars.

B. The Coal Dust Tariff Items are Not Needed to Ensure Efficient Operations

BNSF and UP maintain the Coal Dust Tariff Items are necessary to promote efficient rail operations. *See, e.g.*, BNSF Reply at 15-20; Smith Reply V.S. at 2-10; UP Reply at 18-19; Glass Reply V.S. at 6-7. The carriers’ general efficiency pitch is that because of coal dust, the carriers need to undercut their coal lines more frequently than other lines, and the resulting maintenance windows result in slow orders and other delays that impact train operations.

As with their supply chain contentions, BNSF's and UP's efficiency arguments find no support whatsoever in actual rail operations today. As Coal Shippers demonstrated in their Reply filing, both BNSF and UP are conducting very fluid operations today. Shippers are enjoying fast train cycle times, and train velocities are at peak levels. Indeed, the principal problem that many coal shippers have today is finding a place to park trainsets that no longer need to be in service because of decreased cycle times. What is actually happening in the field today totally undercuts BNSF's and UP's claims that coal dust maintenance is causing slow-downs or inefficiencies in their coal network operations.

BNSF and UP also argue that they are able to meet coal shippers' transportation requirements only by providing special, and inefficient, "enhanced" maintenance for their coal lines. *See, e.g.*, BNSF Reply at 3; Slogget Reply V.S. at 5-6; UP Reply at 4-5; McCulloch Reply V.S. at 2, 11. They posit that "regular" maintenance is maintenance that does not require any maintenance related to coal dust, whereas "enhanced maintenance" is maintenance that is required to address coal dust in the ballast.

BNSF's and UP's verbal gymnastics cannot hide the reality of coal transportation in the United States. Coal has always moved in open top cars. Coal dust from coal moving in these cars has always accumulated along rail rights-of-way. Coal hauling railroads have always included the cost of ballast maintenance, including coal dust related maintenance, as part of their ordinary maintenance costs. Indeed, the Board need look no further than its maximum rate case docket for proof of this fact. In several

recent SAC cases, the Board has included the cost of coal dust removal as part of the real-world railroad costs a stand-alone railroad must bear. *See Coal Shippers Op.* at 34-35.

Nor do volume considerations turn ordinary maintenance on coal lines into inefficient, extraordinary maintenance items. As Mr. McDonald notes, it is a well-known, and long-accepted, principle of railroading that maintenance costs increase as traffic volume increases. *See McDonald Reb. V.S.* at 3. Thus, as traffic has increased on the Joint Line and other BNSF and UP coal lines, their overall maintenance costs have increased, including costs associated with coal dust maintenance, but this is a function of normal railroad operations, *i.e.*, maintenance costs increase (in the aggregate) as traffic increases.

Finally, BNSF and UP treat PRB coal traffic growth as a problem for the carriers. In fact, it has been extremely beneficial for both carriers' bottom lines. Coal is the most profitable commodity transported by both BNSF and UP, a fact acknowledged by BNSF's CEO Matt Rose. *See, e.g., BNSF, Powder River Reflection* (Sept./Oct. 2003) at 6 ("[c]oal is the most profitable commodity we haul"). The growth in this traffic has generated increased costs, and required BNSF and UP to make major expenditures to build and maintain the infrastructure necessary to transport this traffic, but BNSF and UP have made, and continue to make, huge profits on these investments.

**C. The Law Does Not Support BNSF's
Promulgation of the Coal Dust Tariff Items**

Railroads have been transporting coal in open top rail cars for well over a century. BNSF cites no reported agency or court case addressing, much less holding, that

coal shippers are required to spray, or to pay to spray, their cars with dust suppressants. Nevertheless, BNSF claims that its promulgation of the Coal Dust Tariff Items is supported by several legal theories. That is clearly not true.

- **Common Law** – BNSF, UP, NS and CSXT all claim that the common law principles of trespass and nuisance support BNSF’s promulgation of the Coal Dust Tariff Items. *See, e.g.*, BNSF Reply at 15 n.4; CSX Reply at 3. The espoused theory here is that coal shippers “own” their coal and if it is blown out of rail cars, the coal is “trespassing” on rail carrier property and creating a “nuisance.” The carriers’ legal theory is silly.

Coal shippers are not “trespassing” on rail carrier property when coal dust is emitted from rail cars. “Trespassing” requires unauthorized entry onto someone’s property, and any coal dust is emitted from trains that are being operated by railroad personnel on railroad property transporting coal that the carriers are required by law to transport under their common carrier obligation. There is no trespass under these circumstances, nor does a common law nuisance result.

As Coal Shippers demonstrated in their Reply Evidence, there is only one reported case addressing the railroads’ trespass and nuisance claims – the *Entergy Case*. *See* Coal Shippers Reply at 22-23 (citing *Union Pac. R.R. v. Entergy Arkansas, Inc.*, Case No. CV2006-2711 (Circuit Court of Pulaski County, Arkansas, Sixth Division)). In that Case, the presiding judge found that there was no legal basis whatsoever for UP to claim that coal dust emitted from a coal shipper’s cars resulted in a common law trespass or nuisance.

Moreover, the STB is not a common law court, and has no jurisdiction to make legal determinations on common law tort claims. Nor, of course, can a carrier base a tariff on its interpretation of common law tort principles. *See Wooden Grain Doors, Burlington Northern, Inc.*, 350 I.C.C. 768, 774-75 (1975) (“The existence of and remedies for conversion [a common law tort] are legal questions over which this Commission has no jurisdiction. By purporting to provide redress for a wrong in the absence of proper judicial findings, the proposed rules define legal obligations of the parties in a document which has the force of law. Such provisions are not the subject of properly promulgated tariff rules.”).

- **ICC Case Law** – In both its opening and reply filings, BNSF cites old ICC cases holding that shippers were required to pay for providing leak-proof cars to transport grain. *See* BNSF Op. at 18; BNSF Reply at 28-29. Coal Shippers demonstrated in their Reply Evidence that these cases were inapposite because they involved special train service requested by the shippers, not special train service demanded by rail carriers. *See* Coal Shippers Reply at 23-25. The rule that emerged in these old ICC cases was that if a shipper desired special service in the form of a “leak-proof” rail car, the extra expense incurred in providing the special car service rested with the shipper, not the carrier. *Id.*

The ICC also drew the distinction between shipper requests for special train service, and a carrier’s insistence that the shipper use special train service, in the *Radioactive Materials Case, supra*. In that case, the nation’s railroads filed tariffs requiring that shippers transport spent nuclear fuel in special, more expensive train

service. In deciding the case, the Commission observed that “[h]istorically special train service has been a privilege accorded the shipper, rather than any requirement imposed on a shipper.” *Id.*, 359 I.C.C. at 91. The Commission went on to find that the carriers’ tariffs forcing shippers to use special train service, when they did not request it, constituted an unreasonable practice. *Id.* at 96.

- **Industry Practice** – DOT argues in its Reply Comments that coal shippers are responsible for keeping coal in rail cars because that duty already rests with “shippers of virtually every other product.” DOT Reply at 5. DOT’s statements are incorrect for the reasons set forth in the rebuttal verified statement of Paul R. Reistrup. Mr. Reistrup has 50 years of experience addressing railroad operating matters. As Mr. Reistrup explains, railroads move many commodities in open top rail cars in addition to coal, including:

- wood chips,
- iron ore pellets,
- ballast,
- ballast dust,
- sand,
- gravel,
- crushed rock,
- crushed rock dust,
- other aggregates, and
- construction and demolition debris.

Reistrup Reb. V.S. at 2. All of these commodities can and do produce dust or other air emissions and, contrary to DOT's assertions, shippers are not responsible for keeping the commodity in the cars. *Id.*³

DOT also cites the Board's decision in the *North American Freight Case*⁴ as supporting the proposition that it is "the responsibility of the owner of the product being shipped to package or load the product so that it remains within the equipment being used for transport." *See* DOT Reply at 5. With all due respect to DOT, the issue in the referenced case was whether BNSF could lawfully impose "storage and demurrage charges on empty private cars . . . when held on BNSF property beyond a 'free time' period." *Id.* at 1. In deciding this issue, the Board did not address, much less rule, on any issues relating to the loading of rail cars.

- **The Law, Correctly Stated** – As Coal Shippers demonstrated in their Reply Evidence, the governing law concerning loading responsibilities is clear. Shippers are required to load cars to permit the safe transportation of freight. Coal has always moved in open top railcars, and there has been no requirement that the coal be treated or profiled during loading, because neither action is required for the safe transportation of coal. That remains true today.

³ BNSF claims that coal dust curtailment programs have been instituted by carriers in Australia, Canada, and Columbia and also by NS. BNSF Reply at 7-8. However, BNSF does not demonstrate that these carriers require coal shippers to pay special fees for the service {

}

⁴ *North American Freight Car Ass'n v. BNSF Ry. Co.*, STB Docket No. 42060 (Sub-No. 1) (STB served Jan. 26, 2007), *aff'd sub nom. North American Freight Car Ass'n v. STB*, 529 F.3d 1166 (D.C. Cir. 2008).

Once coal is safely loaded onto coal cars, railroads, as common carriers, are required to transport the coal in a safe manner. Responsibility for the lading during transport rests with the common carrier railroad, subject to well-known exceptions. *See* 49 U.S.C. § 11706 (Carmack Amendment); *Missouri Pac. R.R. Co. v. Elmore & Stahl*, 377 U.S. 134, 137 (1964) (under the Carmack Amendment, a carrier is liable for loss or damage to goods transported, unless it can show the loss or damage “was caused by (a) the act of God; (b) the public enemy; (c) the act of the shipper itself; (d) public authority; (e) or the inherent vice or nature of the goods”) (internal quotation marks omitted).

Coal shippers are not responsible for loss or damage to coal that results from coal dust leaving a rail car because, as between the railroad and the shipper, the law places the responsibility for coal loss and damage squarely on the carrier. However, in most instances, a carrier will be absolved from any liability for coal loss and damage due to dust emissions because the loss will occur due to an act of God (*e.g.*, the strength and direction of the wind) or the inherent nature of the goods (*e.g.*, coal transported in open top or bottom dump cars may emit dust along the route of movement due to the way the trains are handled).⁵ Thus, the law, correctly stated, for over one hundred years has been clear – neither shippers nor carriers are legally liable for coal dust coming from coal cars. What BNSF is really asking the Board to do is to create new law that imposes a duty on

⁵ *See, e.g., Union Pac. R.R. v. Am. Silica-Sand Co.*, 243 F.2d 309, 311 (7th Cir. 1957) (holding that carrier was not liable to a shipper for the loss of sand that blew out of an open top rail car because wind loss constituted an act of God that excused the carrier from liability).

coal shippers to spray and profile cars during loading, not to apply existing law, which contains no such requirement.⁶

D. BNSF Could Enter Into Arrangements Where it Agrees to Pay Some or All Coal Spraying Costs, but it Refuses to Do So

BNSF claims that it cannot enter into arrangements with mine operators that call for the spraying, or profiling, of coal trains. According to BNSF, coal mines “are the agents of the shippers” and “BNSF does not have the right or the ability to establish infrastructure for surfactant application on mine property.” BNSF Reply at 29.

BNSF’s assertions here are nonsense. Coal mines are not “the agents of shippers.” Coal mines in the Powder River Basin are owned by companies that are not affiliated with shippers and do not serve as their “agents.” Coal suppliers are usually not affiliated in any way with coal purchasers and the relationships between coal purchasers and coal suppliers are governed by arm’s length contracts between the two independent parties.

Any transaction involving the spraying of coal at PRB mines involves three independent parties – the railroad, the shipper, and the coal mine. BNSF is free to enter

⁶ BNSF claims that EPA’s recent promulgation of rules governing standards and performance for coal preparation and processing plants support its proposed Coal Dust Tariff Items. *See* BNSF Reply at 8. BNSF fails to inform the Board that the part it finds pertinent – new requirements concerning regulation of coal dust from “open coal storage piles” – apply only to new facilities “that commence construction, modification, or reconstruction . . . after May 27, 2009.” EPA did not, as BNSF is attempting to do, apply new emissions standards to existing industry operations. *See* 74 Fed. Reg. 51,950 (Oct. 8, 2009). Also, EPA expressly ruled that it would not regulate coal dust emissions from rail cars “while at the coal preparation and processing plant” because “emissions from these sources . . . have not been shown to be significant.” 74 Fed. Reg. at 51,968.

into arrangements with coal mines where the mine agrees to spray coal in an effort to reduce coal dust emissions, with BNSF paying the costs incurred by the mine. In such transactions, coal shippers' involvement would be limited to ensuring that the spray being used did not adversely impact the shipper's cars, or its plant operations. BNSF is not precluded from entering such arrangements, it simply has chosen not to do so because it wants shippers, not BNSF, to incur spraying and profiling costs.

BNSF contracts with coal mines would not be contracts of first impression. BNSF already has in place contracts with all PRB coal mines where BNSF provides contract crews that provide loading services on mine access and loop tracks owned by coal mines. McDonald Reb. V.S. at 12-13. Nor would such contracts be ones of first impression for dust mitigation. {

}⁷

E. BNSF's Real Interests in this Case are Financial Ones

BNSF's interests in coal dust are purely financial. BNSF's current maintenance costs include costs associated with coal dust fouling of its ballast. BNSF evidently believes that spraying and profiling coal cars will reduce its maintenance costs. This fact comes as no news to this agency. As the STB stated in a decision in 2006:

[C]oal dust fouling a railroad's right-of-way is a source of maintenance expenses for railroads. Railroads and coal shippers are exploring ways to reduce the amount of coal dust

⁷ See Coal Shippers Op. at 36.

lost in transit, such as altering the shape of car loads or spraying agents on the coal, thereby reducing the amounts necessary to be spent on maintenance.

Major Issues In Rail Rate Cases, STB Ex Parte No. 657 (Sub-No. 1) (STB served Oct. 30, 2006) at 43 (footnote omitted).

As Coal Shippers demonstrated in their Opening and Reply Evidence, and further demonstrate in this Rebuttal Evidence, the Board should find BNSF's one-sided Coal Dust Tariff Items constitute an unreasonable practice.

III.

BNSF'S FIXATION ON COAL DUST IS ARBITRARY

BNSF's goal in this proceeding is clear – it wants to reduce its maintenance costs by requiring shippers to spray their coal trains to reduce coal dust emissions. However, as Coal Shippers pointed out in their Opening Evidence, BNSF's goal was the product of an arbitrary fixation on coal dust, as opposed to an informed management decision based on sound studies of such important items as (1) the amount of coal in the ballast of the Joint Line and the Black Hills Line; (2) the source of coal dust in the ballast; and (3) amount of money BNSF could expect to save by requiring shippers to spray for coal dust, since reducing coal dust would have no direct impact on reducing other known significant ballast contaminants. The evidence BNSF tendered on reply, as well as BNSF documents produced in discovery, confirm that BNSF has not taken a hard look at these issues, nor did BNSF have any incentive to do so since it proposes that all spraying costs be borne by its customers.

A. BNSF Has Not Prepared Field Studies Identifying the Scope of Coal Dust Fouling on the Joint Line and the Black Hills Line

BNSF concedes that it has not prepared any detailed field studies or analyses concerning the extent of coal dust fouling on the Joint Line or the Black Hills Line. *See* BNSF Reply at 67; VanHook Reply V.S. at 2-4; Emmitt Reply V.S. at 9. BNSF presents assorted rationales for this glaring omission, but none of them can cooperate with the fact that BNSF has not done its homework.

- **Photographs/Videos** – BNSF attempts to demonstrate that coal dust is a significant problem throughout its PRB coal lines by presenting in its filings some self-selected photos and videos showing trains that are emitting coal dust. Coal Shippers do not dispute that some coal trains do emit dust. However, as shown in many of the other videos BNSF itself produced in discovery, many trains do not emit dust. Coal Shippers include a sampling of BNSF's 2009 videos of unsprayed trains in Counsel's Rebuttal Exhibit 1. The number of trains that emit dust, the location of the dusting events, the amount of dust emitted and the area where the dust collects on the ground is not, and cannot be, measured by a few photos and videos.

Similarly, other BNSF photos and videos show blackened ballast. These photos really do not inform the observer of much of anything. Coal dust acts like carbon black so the fact that a few feet of ballast is black says nothing, by itself, concerning the composition of the fouling agents in the ballast. Nor do these photos and videos show the extent of ballast fouling. Counsel's Rebuttal Exhibit 2 contains recent photographs taken

along the Joint Line on May 25 and 26, 2010. Those photos show track ballast that is not blackened with coal dust.

The point here is that anyone can take photos, or shoot videos, that show what they want them to show – trains dusting or not dusting and track ballast that is black or track that is not black. This photographic and video evidence simply provides snippets of information and does not provide the Board with any credible basis for determining the scope and extent that ballast on the involved PRB lines is fouled with coal dust.

- **Witness Anecdotes** – BNSF and UP present witnesses who provide anecdotal stories concerning the asserted build-up of “coal dust” at some points along their coal routes. *See, e.g.*, VanHook Reply V.S. at 2; Emmitt Reply V.S. at 9. Coal Shippers do not dispute that coal dust and other materials, combined with the heavy weight of the coal trains, result in ballast fouling. However, these anecdotes cannot and do not substitute for the analysis BNSF has not done – a credible study, supported by hard data, concerning the nature and extent of coal dust ballast fouling on its PRB lines. *See Viz Reb. V.S. at 24-25.*

B. BNSF Has Not Prepared Field Studies Identifying How Much Coal Dust Contributes to Actual Ballast Fouling on the Joint Line and the Black Hills Line

BNSF acknowledges that coal dust is one of six readily identifiable ballast foulants. Coal Shippers pointed out on opening that materials BNSF produced in discovery showed that {

}. In its Reply, BNSF pointed to a few other samples where the percentage was higher. *See VanHook Reply V.S. at 5-11.*

The point to be emphasized here is that in some areas coal dust may be a major contributor to ballast fouling, in other areas it is not, and, BNSF has not prepared any studies that provide a representative sampling along the involved lines to show how much fouling is attributable to coal dust and how much is attributable to other contaminants in the ballast.

In its Reply Evidence, BNSF opines that there is no need for studies of this type because research undertaken by Dr. Tutumluer, which was sponsored and paid for by BNSF, shows that coal dust is the “worst” ballast foulant. *See* VanHook Reply V.S. at 11. However, as Coal Shippers demonstrated in their Reply filing, Dr. Tutumluer’s laboratory research did not involve any analysis of fouled ballast on the involved lines and BNSF’s repeated references to Dr. Tutumluer’s laboratory studies cannot hide the fact that BNSF decided not to take representative samples of fouled ballast along the Joint Line and the Black Hills Line to determine how much coal dust was contributing to the fouling of the ballast. *See* Coal Shippers Reply at 13-15.

C. BNSF Has Not Shown that “Large” Amounts of Coal are Coming Out of the Tops of Rail Cars, and that “Negligible” Amounts of Coal Are Coming out of the Bottoms of Rail Cars

BNSF repeatedly asserts that “large” volumes of coal dust come out of the tops of coal cars carrying PRB coal. *See, e.g.,* BNSF Reply at 12; VanHook Reply V.S. at 4; Emmitt Reply V.S. at 5. Coal Shippers do not dispute that some coal dust comes out of the tops of some rail cars but nothing in the materials produced by BNSF in this case credibly demonstrates how much coal dust is being emitted, much less that the amount is

“large.” It appears that BNSF’s assertions here are based on an analysis prepared by Dr. Emmitt of only 20 rail cars. *See* Emmitt Reply V.S. at 9-11. Obviously, this is far too small a sample from which to draw any meaningful conclusions. Moreover, the results are vastly different than studies prepared by utility coal shippers that show very small average coal losses per car. *See* Crowley Rebuttal V.S. at 16.

BNSF also claims that the amount of coal dust coming from the bottom of bottom dump cars is “relatively small.” VanHook Reply V.S. at 3. BNSF predicates this conclusion on an analysis of only a handful of bottom-dump railcars that it equipped with bottom-of-the-car collection devices. As Coal Shippers demonstrated in their Opening Evidence, {

}

Finally, both BNSF and UP claim that the principal source of any coal dust in the ballast on its PRB lines comes from the tops of rail cars. However, the very limited testing BNSF has performed raises serious questions about the accuracy of those claims.

{

}.

UP witness Beck claims that “NCTA committee studies confirm that coal dust losses from the top of railcars are significantly greater from those from the bottom.” Beck Reply V.S. at 3. {

}⁸ {

}

IV.

BNSF’S PROPOSED IDV STANDARDS ARE UNREASONABLE BECAUSE THEY ARE ABITRARY AND NOT SUPPORTED BY SOUND SCIENCE

In its initial filings in this case, BNSF argued that the Board should adopt the IDV standards set forth in the proposed Coal Dust Tariff Items because they were

⁸ “Review of Ballast Fouling on the PRB Joint Line” dated Feb. 26, 2007, NCTA Committee on Ballast Fouling, Report of Spraying Effectiveness Subcommittee (BNSF-COALDUST_0021514 to 21547).

based on, and supported by, “painstaking scientific and engineering research.”⁹ As shown in Coal Shippers’ Opening and Reply Evidence, BNSF’s proposed IDV standards are not supported by sound science or sound research.

In its Reply Evidence, BNSF takes a different tack. BNSF now says that the Board should ignore Coal Shippers’ demonstration that the so-called science behind the proposed IDV standards is totally flawed. According to BNSF “the Board does not need to referee the technical debate between BNSF’s and the shipper’s witnesses” because “[t]he Board is not establishing coal dust standards.” BNSF Reply at 4.

While the Board may not be “establishing” coal dust standards, it is charged with determining whether BNSF’s proposed IDV standards are reasonable. In order to do so, the Board must undertake a thorough review of the asserted “scientific and engineering research” that BNSF claims supports these standards.

DOT agrees that the Board cannot determine whether the Coal Dust Tariff Standards are reasonable without undertaking a thorough and critical review of the asserted science supporting BNSF’s proposed IDV standards:

Shippers have challenged virtually every aspect of BNSF’s [IDV] methodology and its efficacy. . . . The Department appreciates that these very technical factual questions are not within the mainstream of the STB’s experience and expertise. But the obvious alternative – to deem the tariff rule reasonable or unreasonable without such an inquiry – is unacceptable. DOT takes no position on the merits of those questions but believes that the Board must address those of significance.

⁹ See BNSF Reply in Opposition to AECC’s Petition for a Declaratory Order at 2 (filed Oct. 21, 2009).

DOT Reply at 6-7.

BNSF's proposed IDV standards are air emissions standards. Coal Shippers concur with DOT's assessment that issues concerning the development and application of air emission standards are "not within the mainstream of the STB's experience and expertise" (*id.*) but, as DOT correctly concludes, the Board must address them in order to fulfill its statutory obligation to protect the public interest.

Coal Shippers demonstrated in their opening and reply submissions that BNSF's IDV standards are arbitrary and simply cannot serve as the basis for imposing huge costs on the shipping public. Coal Shippers reaffirm this demonstration in their Rebuttal Evidence.

A. BNSF Concedes, as it Must, that its E-Samplers are Not Measuring Materials Deposited in Track Ballast

BNSF's concern in this proceeding is that coal dust is getting into its ballast. However, the E-Samplers it uses to collect particulate data for purposes of calculating IDV values do not measure particulates deposited from passing trains on the ballast. BNSF placed its E-Samplers approximately 60 to { } feet from the rail tracks at its two E-Sampler sites – at MP 90.7 on the Joint Line and at MP 558.2 on the Black Hills Line. Thus, the E-Samplers are attempting to measure particulate emissions some 60 to { } feet from the track, not particulate emissions being deposited in the ballast itself.

In its Reply Evidence, BNSF concedes that its E-Samplers are not directly measuring coal dust emissions from passing trains that go into the ballast, but makes a

variety of claims why this failure is either excusable or not important. See BNSF Reply at 21-22; Emmitt Reply V.S. at 3-4. However, none of the BNSF's assorted excuses or rationales can hide the fact that BNSF's E-Samplers are not measuring particulates being deposited on track ballast at the E-Sampler locations.

- BNSF asserts that "it would be preferable to measure coal dust using instruments located on or near the ballast, but such approach is not practical." BNSF Reply at 22. But this is clearly not the case. {

}.¹⁰

BNSF also has placed dust fall collectors near the ballast. BNSF certainly could devise procedures that call for the proper collection, and analysis, of any particulates deposited in or around the ballast as each train goes by at designated locations. However, BNSF has chosen not do so because, it appears, any such testing would cost BNSF more than it wants to spend.

- BNSF witness Emmitt contends that there is no need for BNSF to measure coal dust in the ballast because the E-Samplers' collection of particulates in the air is a reasonable surrogate or "covariate" for coal dust deposited on the ballast. Emmitt Reply V.S. at 3. However, Dr. Emmitt presents no credible empirical data to support his assertions because it appears BNSF has not collected any such data. See Viz Reb. V.S. at 24 ("[N]either BNSF nor [its consultant, Simpson Weather Associates or "SWA"] have prepared and/or provided any meaningful studies or field data that support a direct link

¹⁰ See UP Reply, Counsel's Exhibit 7 at 4, UPAECCBN-0013576.

between the E-Sampler measurements (as questionable as they are) and corresponding actual coal particulate deposits in the ballast.”).

B. BNSF Has Not Demonstrated, Using Sound Science, that its E-Samplers are Measuring Only Coal Dust

Dr. Emmitt claims that “[t]he E-Samplers measure coal dust, not other airborne contaminants.” Emmitt Reply V.S. at 11. This assertion is simply wrong. The E-Samplers, as used by BNSF, measure all airborne particulates in the air at the time the sampler readings are being made. Thus, at any given time, the E-Samplers could be measuring any form of particulates in the air, including, in addition to coal dust, natural ground dust, dirt, bugs, diesel soot or any other form of airborne particulate. *See Viz Op. V.S. at 5-6.*

The E-Samplers include a filter option which would permit BNSF to collect the actual material analyzed by its E-Samplers. BNSF witness Emmitt claims that his firm, SWA, “used filters to collect the material being measured by the E-Samplers.” Emmitt Reply V.S. at 11. He also claims “. . . the material on the filters was inspected . . . and it was confirmed that the particles collected on the filter were over 99% coal particles.” *Id.* Coal Shippers asked BNSF to provide the workpapers supporting Dr. Emmitt’s assertion¹¹ and were told “there is no documentation of that analysis.”¹² Without this documentation, Dr. Emmitt’s assertions are totally unsupported and neither

¹¹ *See* Letter from Coal Shippers counsel to BNSF counsel at 1 (dated May 11, 2010), copy reproduced in Coal Shippers’ electronic workpapers.

¹² *See* Letter from BNSF counsel to Coal Shippers’ counsel at 1 (dated May 18, 2010), copy reproduced in Coal Shippers electronic workpapers.

Coal Shippers nor the Board have any way of evaluating, much less confirming, whether Dr. Emmitt's assertions are correct or are supported by sound science.

In the absence of any filter data, Dr. Emmitt attempts to demonstrate that the E-Samplers are measuring only coal dust by citing a series of demonstrations that are scientifically unsound because they make no effort to directly correlate E-Sampler readings with the particulates actually measured by the E-Sampler. Moreover, the demonstrations themselves are riddled with other secondary, consequential flaws.

- Dr. Emmitt references a SWA analysis of track-side coal dust in dust collectors that shows “over 90% of the material (by particle count) was identified as coal.” Emmitt Reply V.S. at 12. The record does not contain any of these analyses nor does Dr. Emmitt disclose whether the dust collectors were located anywhere near the E-Sampler locations.

- Dr. Emmitt references a study comparing the amount of dust at two locations – on a line where there is heavy coal traffic and a second where there is little coal traffic. *Id.* However, the study does not set forth, for either location, a breakdown of the contents of the dust.

- Dr. Emmitt references “visual evidence” showing two “dusty” trains at MP. 90.7 on March 24, 2010 which had high calculated IDV.2 values. *Id.* at 13 and Exhibit 8. Looking at two trains in a single day does not provide any statistically meaningful results and Dr. Emmitt did not endeavor to collect any data showing what, if any, coal dust from these trains was deposited in the ballast. *See Viz Reb. V.S. at 24-25.*

- Dr. Emmitt claims that the IDV.2 formula “accounts for ambient dust from the IDV.2 readings.” *Id.* at 14. Of course, this statement completely discredits Dr. Emmitt’s assertion that “[t]he E-Samplers measure coal dust, not other airborne contaminants.” *Id.* at 11. There would be no need to “account[] for ambient dust” if all the E-Samplers were doing was measuring coal dust. In fact, the E-Samplers measure all particulate matter in the air at the time the readings are made. It appears that BNSF has attempted to try to isolate coal dust by statistical manipulation in its IDV.2 formula, but no one knows whether the formula (which has not been produced) is working because BNSF refuses to check the formula results using the filter feature on the E-Sampler.

C. The E-Sampler Output BNSF is Using is Not Accurately Measuring Particulate Emissions

BNSF states that its purpose in using the E-Samplers is to measure the amount of dust emitted by passing trains. *Id.* at 15-16. BNSF uses a computer program to convert the E-Sampler output into “dust units” and, according to BNSF, the higher the average number of dust units over a specified period, which BNSF refers to as an “integrated dust value,” the higher the amount of dust emissions from a particular train. *Id.* at 20. BNSF further claims that if all trains moving on the Joint Line have an IDV.2 value of 300 dust units or less, and all trains moving on the Black Hills Line have an IDV.2 value of 245 dust units or less, the amount of coal dust in its ballast on these two lines will be “substantially eliminate[d].” BNSF Op. at 6.

In their Opening Evidence, Coal Shippers demonstrated that BNSF was not following the manufacturers’ instructions for use of the E-Sampler laser methodology to

develop accurate readings of particulate mass or concentration. Viz V.S. at 9. These instructions call for the user to adjust the laser readings (which BNSF is using) to the corresponding readings produced by the gravimetric filter in the E-Sampler (which BNSF is not using) in order to produce accurate measurements of particulate mass and concentration.

BNSF concedes that it is not using the E-Sampler filters. However, BNSF claims that there is no need to do so because BNSF is not measuring the “specific mass” of coal particles emitted from passing trains, but instead is measuring something it refers to as “the relative dustiness of trains” using “dust units.” Emmitt Reply V.S. at 16. BNSF opines here that the E-Samplers laser output consists of voltage signals and that “[t]he strength of the electric signal is proportional to the amount of dust in the air.” *Id.* Thus, according to BNSF, “[a] voltage signal of 10X means that the sample has ten times the amount of dust as a voltage signal of X.”¹³

Coal Shippers’ witness Dr. Mark Viz, who is one of the nation’s leading coal dust experts, shows that BNSF’s “relative dustiness” assertions are simply misguided efforts to obscure the fact that BNSF is not properly using the E-Samplers.

First, as Dr. Viz explains, when BNSF refers to “dust units,” it is referring to the voltage output of the E-Samplers, which is not itself a measure of dust particulate concentration:

When receiving analog output data from the E-Samplers at MP90.7, SWA receives an output signal from each E-Sampler that corresponds to the reflected light intensity sensed by the

¹³ BNSF Reply at 23-24.

internal photodiodes. This signal is a voltage, and it is recorded every five (5) seconds. SWA can call it a “dust unit” or “dust signal,” but the simple reality is that it is a voltage. Now, since SWA does not download or even reference any of the internal concentration data stored by the E-Sampler (and internally converted to units of mg/m^3), all SWA knows for any given sampling period is a table of voltages generated every five (5) seconds. SWA does not know if a 1.0 volt output reading corresponds to a concentration of $1 \text{ mg}/\text{m}^3$, $10 \text{ mg}/\text{m}^3$, $100 \text{ mg}/\text{m}^3$,

Viz Reb. V.S. at 9.

Second, as Dr. Viz explains, BNSF has presented absolutely no proof that there is in fact a linear relationship between the E-Sampler voltage output and the amount of dust in the air:

BNSF and SWA’s central claim, that the output (voltage) signal from the E-Sampler is linearly proportional to the particulate concentration being sampled is simply not substantiated or supported by any test data or related work performed and/or provided by BNSF, SWA, or Met One (the manufacturer of the E-Sampler).

Id. at 7. Other agencies charged with supervising air emission standards require that linear relationships be demonstrated, not assumed. *See, e.g., EPA Quality Assurance Handbook for Air Pollution Measurement Systems, Volume I: A Field Guide to Environmental Quality Assurance* at 6-2 (EPA/600/R-94/038a) (April 1994) (“Linearity of instrumental response must be demonstrated, not assumed.”). The STB must do the same.¹⁴

¹⁴ *See, e.g., Information Quality Guidelines*, STB Ex Parte No. 587 (STB served Oct. 1, 2002), 2002 WL 31169417 at *3 (“scientific or statistical information should be provided with supporting data and models”).

Third, Dr. Viz explains that one way to establish whether a linear relationship exists between the E-Sampler output for the sampled air and the concentration of particulates in the air for the same air sample is to use the gravimetric filter feature in the E-Sampler. The filter produces accurate measurements of particulate concentration and has been approved by EPA as a “reference method” for use in measuring air particulate concentrations. Viz Reb. V.S. at 2.

BNSF has chosen not to use the filter in the E-Samplers, {

¹⁵ A copy of the study report is included in Coal Shippers’ rebuttal workpapers.

}

Fourth, Dr. Viz refutes BNSF's contentions that the linear relationship can be demonstrated by reference to Met One's laboratory calibrations of BNSF's E-Samplers. According to Met One, "[e]very E-Sampler is factory calibrated using

polystyrene latex spheres of known index of refraction and diameter at multiple points to validate linearity.” *Id.* at 13.¹⁶

The linear relationship Met One is talking about is one between E-Sampler output voltage and the actual concentrations of the polystyrene spheres, which have a uniform size, shape, and reflectivity:

BNSF bases its conclusions regarding the supposed linearity of the E-Samplers output signal on calibrations that Met One performs in a laboratory setting using small, uniformly (lightly) colored polystyrene spheres of a uniform size, shape and reflectivity. In this calibration procedure, Met One likely introduces a known mass of such spheres into a known volume of sampling air and then draws that air through the E-Sampler’s laser beam to then obtain voltages from the light that is reflected off the particles onto light-sensitive elements. Met One would then compare the output voltage from the light-sensitive elements to the known, actual concentration of test spheres that they had earlier introduced into the sampler. Met One would then adjust the internal “gain” of the electronics to establish a match between the output voltage and the actual concentrations. This procedure would be repeated using test spheres over a range of uniform sizes to then establish that a linear relationship exists between the output voltage and the actual concentrations.

Viz Reb. V.S. at 3-4.

However, as Dr. Viz explains, the particulates measured by BNSF’s E-Samplers do not have a uniform size, shape, and reflectively. As a result, when an E-Sampler is sampling real-world particulates, not laboratory spheres, there may well be no linear relationship between E-Sampler voltage outputs and the real-world particulate concentrations:

¹⁶ See Coal Shippers Op. at 26.

[T]he ability of a light-scattering device such as an E-Sampler to yield linear and reliable results when measuring test spheres in a laboratory does not guarantee that the sampler will produce results that are likewise linear and reliable when measuring actual particulate matter, such as coal, of varying sizes, shapes and reflectivities. An E-Sampler that has been correctly calibrated using polystyrene test spheres could in fact fail to correctly output measurements (voltages) that would identify the relative “dustiness” of coal emissions from different trains because of the irregularity of the sizes, shapes and reflectivity of the coal particulate (and any other particulate that happens to be drawn through the E-Samplers at MP90.7).

Id. at 4. Dr. Viz study for NCTA provides a vivid illustration of this fact. *Id.*

Dr. Viz also explains that BNSF’s error is not simply a technical or academic one. Study after study has found that it is absolutely essential to test and adjust the outputs of E-Samplers, or similar types of light scattering devices, using known mass concentrations of the particulate being studied, rather than mass concentrations developed using laboratory particulates such as polystyrene latex spheres. As summarized in one leading study cited by Dr. Viz:

Most of the [aerosol] sampling instruments are designed and calibrated at standard conditions, but in real applications, they are used in different situations in laboratory and field tests. *The error can be so large that the investigators have to discard the test results.* Unfortunately, sometimes it is not recognized by many applicators and the results are misleading. So it is critical to evaluate the sampling efficiency of aerosol instruments in real applications.

Viz Reb.V.S. at 15 (emphasis added). Similarly, another leading study found:

Changes in the composition of the dust or in its size distribution can have considerable effects on the indicated mass concentration and, in the case of dust composition, the effect is not easily predictable. *It is therefore essential to*

calibrate [light scattering (the paper uses trade names for specific devices)] monitors against appropriately size-selected gravimetric samples of the dust to be monitored and, to guard against changes in the dust characteristics with time, periodic checking of the calibration is considered necessary.

Id. at 13 (emphasis added).

Fifth, Dr. Viz correctly concludes that BNSF's failure to show that there is any linear correlation between the E-Sampler voltage readings and the "relative dustiness" of trains undermines its entire IDV calculation and ranking system:

[BNSF's] fundamental inability to assure linearity when measuring real-world particulate matter . . . undermines BNSF's effort to rely upon the E-Samplers as they have been and continue to be used to provide "relative dust unit" determinations. As BNSF and SWA's claim of linearity is the cornerstone of their "relative dustiness" scheme, the inability to assure linearity causes BNSF's "relative" ranking of coal train dust emissions to collapse.

Id. at 4-5.

D. BNSF's Own Field Tests Confirm that its E-Samplers are Not Making Accurate Measurements of Particulates

{

}

BNSF claims in its Reply Evidence that the disparate side-by-side E-Sampler results reflect asserted "uncontrollable environmental factors." Sultana Reply V.S. at 5. As Mr. Sultana explains, two side-by-side E-Samplers, measuring air emissions using a common air intake device, can produce different readings because the

“dust particles are not distributed evenly in a sample of air.” *Id.* Mr. Sultana goes on to state that there is no way to tell whether his supposition is correct because it is not possible “to measure the same dust sample twice by the same E-Sampler.” *Id.*

Of course, Mr. Sultana’s assertion is simply not correct. The E-Sampler, by design, contains two methods to measure the same dust sample – a laser method and a gravimetric filter. BNSF, and its consultants, could have, but clearly chose not to, measure the E-Sampler results obtained using the laser with the results obtained using a filter to see if the E-Samplers were accurately measuring coal dust emissions, but, as Dr. Viz explains, BNSF deliberately chose not to do so:

[BNSF seems] to have stumbled upon a well-documented phenomenon in the literature regarding particulate monitoring, namely, that the particular characteristics of the matter being sampled can add considerable variability to the monitoring method *UNLESS* certain actions are taken to account for these characteristics. ... The simple point is that this variability – whether from the E-Samplers or the matter being sampled or some combination of both – can be quantitatively addressed and incorporated in corrections to concentration output if certain steps are performed, especially if the E-Samplers are run using filters or are run side-by-side with other Federal Reference Method devices (as just about every other user of these devices does as documented in the literature). But all BNSF and SWA have at their disposal to attempt to quantify variability are streams of monitor output voltages. They even admit they have no idea how these output voltages correspond to real concentrations. This begs the question ... how can BNSF and SWA perform any study of side-by-side E-sampler variability if all they have to work with are output voltages that cannot be linked to any of the “real” particulate or sampler characteristics that are the very source of the inter-sampler variability? The simple answer is that BNSF and SWA cannot account or accurately assign inter-sampler variability uniquely to any particular characteristics of the particulate or the samplers themselves

because they choose not to perform the science required to do so.

Viz Reb. V.S. at 18 (footnotes omitted).

{

}

E. Neither Coal Shippers, Nor the Board, Can Evaluate BNSF's IDV.2 Standards Unless BNSF Turns Over the Computer Program Used to Develop and Implement the Standards, Which BNSF Refuses to Do

BNSF claims that it takes the E-Sampler output data and processes that data using a computer program to produce IDV.2 dust unit calculations. Obviously, the contents of the program are central to being able to understand and replicate how BNSF is making its IDV.2 calculations. Coal Shippers cannot do so unless they access the program.

Coal Shippers asked BNSF to produce the IDV.2 program in discovery, but BNSF refused to produce it. As Coal Shippers demonstrated in their Opening Evidence, BNSF's failure to produce the program is a blatant violation of the Board's rules of practice. *See id.* at 30.

BNSF claims in its Reply Evidence that Coal Shippers' contentions here are a "red herring" because "BNSF/SWA have made available . . . the detailed logic and assumptions used to produce the IDV.2 calculations." *Id.* at 27. In fact, all BNSF has provided is a truncated narrative describing some of the asserted steps in its IDV.2

calculations. The only way that Coal Shippers and the Board can determine whether BNSF's description is correct is to review the actual program. That is why the STB's rules of practice require production of consequential computer programs, subject to the protections accorded "highly confidential" documents under the governing protective order.

Dr. Emmitt also claims that Coal Shippers could "hire a computer programmer to convert the [IDV.2] logic into computer code." Emmitt Reply V.S. at 21. This assertion is nonsense because, as stated above, the program must be reviewed to see if the description is correct, and as Dr. Viz demonstrates, even if BNSF's explanation was correct, it is grossly incomplete so no "computer programmer" could "convert the [IDV.2] logic into computer code." Viz Reb. V.S. at 21-24.

**F. The Statistical Analysis BNSF Used to Derive
the IDV.2 Train Limits is Fatally Flawed**

{

}

Rather than abandoning the use of E-Samplers, BNSF switched gears and attempted to use a different form of statistical test to justify its use of E-Samplers – linear regression analysis. BNSF proceeded to regress the results of { } side-by-side E-Sampler data pairs and, based on this analysis, concluded that if a train passed MP 90.7 with an IDV value of 300 dust units or higher, there was a 95% probability that the train had an IDV level that actually was greater than 134, which was BNSF’s internal reduction target IDV figure.

Coal Shippers demonstrated in their Opening Evidence that BNSF could not rely upon a linear regression analysis because neither monitor in BNSF’s side-by-side variability testing was shown to be accurately measuring particulate emissions. BNSF appears to agree that linear regression does not produce statistically meaningful results if the data inputs are not accurate, but claims that “BNSF ensures the accuracy of the E-Samplers through frequent calibration by the manufacturer.” Sultana V.S. at 10. However, as discussed above, the manufacturer here does not “calibrate” the E-Sampler to accurately measure particulate emissions at the E-Sampler locations. Thus, regression is impermissible because the input data has significant measurement errors. *See* Andrew Reb. V.S. at 8-12.

Coal Shippers also demonstrated in their Opening Evidence that even if BNSF’s data points were accurate, BNSF’s regression analysis failed because the range of variability was not relatively constant over the entire data set. BNSF agrees that variation must be relatively constant, but claims that the range of variability in its data set meets this test. *See* Sultana Reply V.S. at 10-16. However, as Dr. Andrew demonstrates

in his Rebuttal Verified Statement, BNSF is incorrect because variance in BNSF's data set increases as calculated particulate levels increase. Andrew Reb. V.S. at 12-16.

Finally, as Coal Shippers demonstrated in their Reply Verified Statement, and reaffirm in this Rebuttal Evidence, even if BNSF could properly use linear regression to address E-Sampler variability, most of the { } data pairs BNSF used in its analysis, should not have been used. These include {

}, a sample size that is far too small to reasonably measure "variability" in the E-Sampler readings. See Viz Reb. V.S. at 16; Andrew Reb. V.S. at 17-18.

G. BNSF's Use of E-Samplers, and its Development of the IDV.2 Standards, Should Be Peer Reviewed

BNSF concedes that its use of E-Samplers, and its development of IDV standards has not been peer reviewed. However, BNSF argues that peer review is not necessary or important here because "BNSF is not engaged in academic research of coal dust monitoring approaches" and any suggestion for peer review "appears to be just an excuse to take no action." Sultana Reply V.S. at 2.

Coal Shippers understand that BNSF is not engaged in "academic research," but peer review is not limited to the academic community. BNSF is proposing an air emission standard. Most air emission standards are promulgated by EPA and EPA has a standard policy that calls for peer review of proposed air emission standards prior to

their promulgation. See EPA, *Peer Review and Peer Involvement at the U.S.*

Environmental Protection Agency at 1 (2006) (“Peer review of all scientific and technical information that is intended to inform or support agency decisions is encouraged and expected.”).¹⁷

EPA calls for peer review because even though it has an expert staff, it recognizes that air emission standards raise complex scientific issues and the best way to address these issues, and to get the science right, is to seek out input from scientists with expertise in these complex areas. See EPA, *Peer Review Program* at 1¹⁸ (“Peer Review, the evaluation of a product by experts in that field who were not involved in that product’s development, is a critical tool used by EPA to ensure that only high-quality, sound science is released and/or used by the Agency.”)

EPA also recognizes that notice and comment procedures are no substitute for peer review by qualified scientists. See EPA, *Peer Review Handbook*, 3d ed. at 14¹⁹ (“public comment does not necessarily draw the kind of independent, expert information and in-depth analyses expected from the peer review process . . . [and] [w]hile it may be an important component of EPA’s decision making process, public comment does *not* substitute for peer review.”) (emphasis in original).

It is particularly important that the STB, which is not an agency possessing expertise in the setting of air emission standards, follow EPA’s lead, and not permit

¹⁷ See www.epa.gov/peerreview/pdfs/peer_review_policy_and_memo.pdf.

¹⁸ See <http://www.epa.gov/USA/spc/2peerrev.htm>.

¹⁹ See EPA/1001B-061002.

BNSF to publish air standards until BNSF's proposed procedures are subject to rigorous peer review. This result is also fully consistent with Office of Management and Budget ("OMB") policy directives. *See Final Information Quality Bulletin for Peer Review*, 70 Fed. Reg. 2664, 2674, at 32 (Jan. 14, 2005) ("OMB Bulletin") ("agencies are encouraged to hold peer reviews of scientific assessments supporting adjudications").

Also, peer review is not an excuse to take no action, as BNSF claims, but a call for the STB to take only responsible action based on sound science in an area that clearly falls outside the agency's regulatory expertise. *See OMB Bulletin*, 70 Fed. Reg. at 2665, at 2-3 ("Peer review typically evaluates the clarity of hypotheses, the validity of the research design, the quality of the data collection procedures, the robustness of the methods employed, the appropriateness of the methods for the hypotheses being tested, the extent to which the conclusions follow from the analysis and the limitations of the overall product.").

V.

BNSF'S PROPOSED COAL DUST TARIFF ITEMS ARE UNREASONABLE BECAUSE COMPLIANCE COSTS EXCEED BY A WIDE MARGIN THE COSTS OF CONTINUING TO ADDRESS COAL DUST THROUGH TRADITIONAL MAINTENANCE TECHNIQUES

In their Opening Evidence, Coal Shippers presented testimony from Witness Crowley describing an analysis of the costs of spraying PRB coal trains as compared to the cost of continuing to address coal dust through normal maintenance practices. This analysis relied on {

}

In their Reply evidence, BNSF and UP claim that Mr. Crowley has understated the maintenance costs related to coal dust and has overstated the costs to

apply surfactants to coal trains in the PRB. They also suggest that “[t]he relative costs of surfactant application or increased maintenance would be insignificant compared to the costs to the economy associated with a large scale interruption of the supply of coal from the PRB.”²⁰ VanHook Reply V.S. at 24.

BNSF’s Mr. VanHook presents a number of revisions to Mr. Crowley’s calculations of maintenance costs and spraying costs each of which are addressed by Mr. Crowley in his Rebuttal Verified Statement submitted herewith.

A. Incremental Maintenance Costs Associated with Coal Dust

Mr. VanHook made several adjustments to Mr. Crowley’s maintenance cost analysis for the Orin Subdivision. {

²⁰ The suggestion that the Board should compare the costs of a “service interruption” for PRB coal transportation to the costs to coal shippers of spraying coal is entirely nonsensical. Effectively, BNSF is saying the Board should assume that if BNSF does not get its way with its initiative to shift these roadway maintenance costs to shippers, it will not continue to maintain its PRB tracks in a safe and satisfactory condition, thus causing service disruptions.

},²¹ {

²¹ BNSF describes these items in its Argument as “opportunity costs associated with longer cycle times” rather than expenditures for maintenance. BNSF Reply at 18.

}

UP has also challenged Mr. Crowley's calculations of incremental maintenance costs related to coal dust. *See* Glass Reply V.S. at 3-6. However, as Mr. Crowley explains, each of UP's criticisms of his analysis boils down to his failure to analyze costs on the UP's line segments. UP has made unsubstantiated claims with respect to the impact of coal dust on its maintenance costs, but has provided no quantitative analysis of the impact of coal dust on such costs. Accordingly, Mr. Crowley has made no adjustments to his analysis in response to UP's criticisms. Crowley Reb. V.S. at 12-13.

B. Costs of Applying Surfactants

Both BNSF and UP challenge the cost of spraying coal trains with surfactants as being unrealistically high. VanHook Reply V.S. at 31-32; Glass Reply V.S. at 7. Mr. VanHook states that BNSF's experience in the surfactant trial currently underway "*suggests*" that the costs of surfactants will be below { } per ton. VanHook Reply V.S. at 31 (emphasis added). He also expresses the *understanding* that charges to shippers for surfactant application approximate { } per ton and "*assume[s]*" that the cost will come down to around { } per ton over time. *Id.* (emphasis added). Mr. Glass expresses optimism that costs for controlling coal dust will come down and says that {

} Glass Reply V.S.

at 7.

As Mr. Crowley explains, Coal Shippers requested support from BNSF and UP for the cost estimates provided by their respective witnesses. BNSF reported that

{ } UP

reported that {

}

{

}, Mr. Crowley has continued to rely upon {

} Applying those costs to the annual volume of

{ } million tons presented by Mr. VanHook, produces an estimated total cost of

spraying between { }. *Id.* at 17. Compared to the

incremental costs of maintenance associated with coal dust of {

}, Mr.

Crowley's analysis continues to show a large disparity in the cost of spraying versus the incremental cost of dealing with coal dust through traditional maintenance techniques.

UP criticizes Mr. Crowley for comparing the cost of spraying all PRB coal trains, both those originated by BNSF and those originated by UP, with incremental maintenance costs for only the Joint Line and other BNSF PRB line segments. Glass Reply V.S. at 4-5. With respect to the appropriate coal volume, Mr. Crowley explains

that although Mr. Glass states that “Union Pacific customers are not subject to BNSF tariff rules at issue” (Glass Reply V.S. at 4), “UP is fully supporting BNSF tariff rules and has positioned itself to apply those rules to its own coal shippers.” Crowley Reb. V.S. at 18. Because it appears that UP may well institute the same program as BNSF’s, either voluntarily or under BNSF efforts to enforce operating rules, it is clearly appropriate to include UP originated PRB coal volumes in evaluating the cost of applying surfactants. *Id.* at 18-19.

Insofar as the cost of incremental maintenance costs associated with coal dust is concerned, as Mr. Crowley explains at pages 12-13 of his Rebuttal Verified Statement, UP has not submitted any data concerning such costs. “UP has cost and maintenance data to determine its maintenance costs and develop the increased costs due to coal dust. UP has not presented any of this cost data.” *Id.* at 13. UP should not be heard to complain that Mr. Crowley’s analysis does not take into consideration data it has chosen not to submit.

Because the best evidence of record demonstrates that the cost of spraying coal trains would substantially exceed the costs of dealing with coal dust through traditional means, the Board should find that forcing coal shipper to engage in spraying constitutes an unreasonable practice. *See Conrail, supra*. As DOT recognized in its Reply Comments, “[s]ound public policy militates in favor of resolving the problem posed by coal dust emissions in the most cost-effective way.” *Id.* at 7.

VI.

BNSF'S PROPOSED COAL DUST TARIFF ITEMS ARE UNREASONABLE BECAUSE THERE ARE NO PROVEN COMPLIANCE METHODOLOGIES

BNSF describes its challenged rules as establishing “performance-based standards in that they measure whether individual coal trains emit quantities of dust that exceed or fall below a specified dust emissions level.” BNSF Op. at 22-23. It argues that this approach is better than an “activity-based approach” because it “give[s] shippers the leeway to determine on an individual basis the method of complying with the standard that best suits each shippers needs.” *Id.* at 23. Coal Shippers have explained that this rationale is faulty because there are no practical methods of compliance a shipper can choose that will assure that its trains will comply with the standard. Coal Shippers Op. at 47-48.

It is clear from the evidence that the only approach to preventing coal dust from blowing out of rail cars that has received serious attention (other than profiling) is to spray the cars with surfactants. The record contains brief reference to the exploration of using covers on cars, and even briefer mention of the possibility of using rollers to compact loads in cars, but neither of these possible approaches has been supported with any evidence to demonstrate that they would be either practical or economical. {

}²² {

²² {

}

UP says that it is considering covers, but it is clear that this consideration is at an early stage and UP has not submitted any evidence supporting the feasibility of that option.

Coal Shippers Reply at 20.

Even spraying does not offer any assurances of achieving compliance with BNSF's IDV.2 dust standard. As Coal Shippers have pointed out, {

} Coal Shippers Reply at 20-21.

In its Reply, BNSF responds to the absence of an assured means of compliance with its IDV.2 standard by suggesting that this problem will be solved by the "large trial in the PRB of surfactants and other compliance measures" which it initiated when it extended the date for implementing its standards. BNSF Reply at 34. However, BNSF has not introduced any evidence in this proceeding regarding the results of this trial and has not produced any such information to Coal Shippers to enable them to evaluate the trial's methodology and any results. If BNSF attempts to submit any such evidence at the rebuttal stage, it should be stricken by the Board due to BNSF's failure to

}

submit it at a time when Coal Shippers and other shipper interests could evaluate the trial methodology and results and file responsive evidence.

The challenged tariff item also includes a profiling requirement. This measure also lacks any proven means of achieving compliance. *See* Section VIII, *infra*. Moreover, BNSF states that “[even] if coal cars are loaded to the ideal profile, substantial dust emissions still occur.” BNSF Op. at 14.

The absence of any demonstrated means of assuring compliance with the challenged standards is especially problematic when considered in the context of BNSF’s refusal to articulate the consequences of failing to achieve compliance as addressed in Section IX below.

VII.

BNSF’S PROPOSED COAL DUST TARIFF ITEMS ARE UNREASONABLE BECAUSE SHIPPERS WILL BE FORCED TO PAY TWICE OR THREE TIMES FOR THE SAME MAINTENANCE COSTS

In their Opening Evidence, Coal Shippers explained that rail lines handling coal trains have always experienced coal dust falling onto the roadbed from passing trains. Mr. McDonald, a professional engineer with over 40 years of experience in railroad engineering, maintenance and operations, including extensive experience and familiarity with coal lines in the PRB, explained that coal dust has always been a recognized phenomenon in the PRB that has always been addressed through track maintenance programs. McDonald V.S. at 4-8. As coal volumes grew over time, so too

did the amount of coal dust, as well as the amount of fines produced by breakdown of ballast and other contaminants. *Id.*

Accordingly, BNSF has always incurred costs to maintain its coal lines and those costs have increased as coal volumes have grown. Such maintenance costs have included ballast shoulder cleaning and undercutting to deal with the fouling of ballast by coal dust and other contaminants. *See Western Fuels Ass'n, Inc. v. BNSF Ry.*, STB Docket No. 42088 (STB served Sept. 10, 2007) at 74-75; *Otter Tail Power Co. v. BNSF Ry.*, STB Docket No. 42071 (STB served Jan. 27, 2006) at C-28.

Rail rates for PRB coal transportation are designed to cover all costs incurred to provide service, including, as acknowledged by BNSF, “. . . maintenance costs relating to ballast cleaning, undercutting and shoulder cleaning” Crowley V.S., Exh. TDC-2. As a result, to the extent that coal shippers are required to pay for spraying surfactants on coal trains in order to reduce coal dust, they will be paying both the spraying costs and the costs to deal with coal dust through traditional maintenance techniques that are embedded in the rates.

Although BNSF continues its refusal to explain what the consequences of failing to comply with its IDV.2 standard will be, it seems clear that BNSF contemplates the possibility of financial penalties (described as “special handling charge[s]”) for such failures, even though the imposition of such penalties may be delayed where the shipper is spraying its trains. BNSF Op. at 26-27. Under those circumstances the shipper would effectively be paying three times to deal with the coal dust.

Both BNSF and UP suggest that this duplicative payment situation would not arise, but for different reasons. BNSF argues first that “BNSF’s coal dust standards will have no impact on BNSF’s normal maintenance costs on such high density lines.” BNSF Reply at 13. They say this is because “high levels of maintenance on PRB lines” will still be required “even after coal dust emissions have been controlled.” *Id.* This argument runs completely contrary to BNSF’s arguments about the need to control coal dust because it can no longer deal with the coal dust relying on maintenance activities such as shoulder cleaning and undercutting. Supposedly, the amount of coal dust requires such activities to be performed too frequently. According to that argument, keeping the coal dust in the cars will reduce accumulation of coal dust on the roadbed with the result that shoulder cleaning, undercutting, vacuuming and other maintenance activities will be reduced to a manageable level and frequency. It is logical and obvious that to the extent BNSF’s maintenance activities are reduced by spraying coal trains, its maintenance costs will be reduced. BNSF’s claim to the contrary is simply not credible.

BNSF also attempts to deflect the claim that forcing coal shippers to pay for spraying (and possibly special handling charges) while continuing to pay amounts embedded in rates for traditional maintenance renders its coal tariff unreasonable, by claiming that such concerns should be raised in a rate case. “The shippers’ logic is that BNSF’s coal transportation rates in effect now reflect a certain level of maintenance, but if a dust curtailment is implemented less maintenance will be required, with the result that rates will be higher than they should be If and when a shipper has a claim that its rates are unreasonably high, the shipper can pursue a rate reasonableness claim.”

BNSF Reply at 33. This is simply an exercise in misdirection. The shippers' complaint is that the challenged coal dust tariff items are unreasonable because shippers will be forced to pay for spraying coal trains to deal with an issue they are already paying to address under their rates. The excessive payment is the cost of the spraying, which would not be paid to BNSF, but to other parties.

This Board clearly has authority to consider all relevant evidence going to the reasonableness of a challenged practice under 49 U.S.C. § 10702 (2). The Board "has developed no single test for judging whether a particular practice is unreasonable." *WTL Rail Corp. – Petition for Declaratory Order and Interim Relief*, STB Docket No. 42092 (STB served Feb. 17, 2006) at 6. Instead, the Board conducts a "case-by-case analysis" (*id.*) and "tailor[s] its analysis to the evidence proffered and arguments asserted under a particular set of facts." *North America Freight Case, supra*, STB Docket No. 42060 (Sub-No. 1) (STB served Jan. 26, 2007) at 8. The Board has rejected other railroad challenges to its authority to consider unreasonable practice claims on the grounds that they were related to rates. *See Rail Fuel Surcharges*, STB Ex Parte No. 661 (STB served Aug. 3, 2006) at 3-4.

UP takes a different tack. It claims that the shippers' argument presupposes that their rates are established on the basis of a cost formula, while in fact it sets rates based on "the marketplace for coal and coal transportation." Glass Reply V.S. at 9.

{

} Finally, it claims that

“[i]f Union Pacific as a whole has not recovered its costs as a network [including an economic profit/return on investment equal to its cost of capital], then coal rates cannot have paid for all of the costs associated with moving coal.” *Id.* at 10.²³ None of these arguments has any validity or detracts from the force of shippers’ argument on this issue.

VIII.

BNSF’S PROPOSED TRAIN PROFILING STANDARDS ARE UNREASONABLE

Coal Shippers understand that all PRB mines now utilize loading chutes that are designed and intended to “profile” rail cars in an effort to reduce coal dust emissions. The PRB mines took this action as a result of private sector discussions between PRB coal shippers, the mines, and the railroads (BNSF and UP).

Despite this private sector resolution, BNSF went ahead and included in the Coal Dust Tariff Items a requirement that coal cars that “move” over the Joint Line or the Black Hills Line retain the profile. BNSF is currently attempting to “laser” trains moving over these two lines many miles away from the mines and, if the required profile is not in place, BNSF is notifying coal shippers that their trains are not in compliance with BNSF’s proposed tariff profiling standards.

Coal Shippers submit that BNSF’s actions, if permitted to stand, will have a chilling effect on any future efforts by shippers, carriers, and the rail industry to endeavor to voluntarily undertake private sector actions to resolve common problems. Moreover,

²³ Of course, rates can be found unreasonable even if a carrier is not “revenue adequate” on a system-wide basis. *See Coal Rate Guidelines, Nationwide*, 1 I.C.C.2d 520, 536 (1985)

trains that are loaded to meet BNSF's profiling standards at the mine may not meet these standards later on in the movement because loads have shifted due to no fault of the coal shipper or the mine operator.

Coal Shippers request that the Board find that BNSF's coal profiling standard, as written, constitutes an unreasonable practice. Alternatively, Coal Shippers request that the Board order BNSF to modify the first lines in Item 100 and 101 to read as follows:

Shipper shall ensure that all cars loaded with coal from any mine origin that move over the [Joint Line in the Powder River Basin ("PRB")/milepost 558.2 on the Black Hills Subdivision in Wyoming] are shall be loaded using a loading chute that complies ~~profiled in accordance~~ with BNSF's published template entitled "Redesigned Chute Diagram" located in Appendix A to this publication.

The purpose of the proposed changes is to require that coal shipper's mine operators have, and use, appropriate loading chutes. If that standard is met, coal shippers will not be responsible for maintaining car profiles long after a car has left a mine.

IX.

BNSF'S PROPOSED COAL DUST TARIFF ITEMS ARE UNREASONABLE BECAUSE BNSF HAS NOT PUBLISHED PROPOSED ENFORCEMENT PROCEDURES AND PENALTIES

Coal Shippers demonstrated in their Opening Evidence that BNSF has not identified what the consequences would be if a shipper fails to comply with the challenged coal dust tariff items. Without knowledge of the consequences of violating

the tariff provisions, the Board cannot make a reasoned decision concerning their reasonableness. Coal Shippers Op. at 48-50.

BNSF claimed in its Opening Evidence that since it “has not adopted any particular measures to ensure compliance with its coal dust emissions standards,” it is “premature” for the Board to give any consideration to what enforcement consequences it might adopt. BNSF Op. at 25. Nevertheless, in a tacit acknowledgement of the relevance and importance to this proceeding of the enforcement approach it adopts, BNSF spelled out what it describes as “a framework for its likely approach to enforcement.” *Id.*

Coal Shippers addressed the elements of BNSF’s proposed enforcement framework in detail in their Reply Evidence and demonstrated that, individually and collectively, they do not provide the Board sufficient detail to allow it to assess the reasonableness of the challenged tariff items. Coal Shippers Reply at 28-32. In particular, there is no description of the terms of the “certificate” that BNSF would require a shipper to execute in the event that one of its trains failed to meet the IDV.2 standard; the “special handling charge” for non-compliant coal trains is not quantified, nor is it clear when it would apply; and the denial of service element lacks meaningful definition, but clearly will be used as a threat to force compliance. *Id.* at 29-30.

Coal Shippers also explained that {

}

There is no compelling reason why BNSF cannot define its enforcement mechanism now so that the Board can make a decision with the benefit of being informed as to all the critical elements of the program BNSF seeks to implement. Principles of judicial economy discourage the sort of piecemeal litigation that would otherwise result. *See, e.g., St. Louis S.W. Ry. Arbitration Appeal*, ICC Finance Docket No. 28799 (Sub-No. 9), 1995 WL 479439 (ICC served Aug. 15, 1995), at *4 (“judicial doctrines to prevent . . . piecemeal litigation . . . serve the dual purpose of protecting a litigant from the burden of retaliation and of promoting judicial economy”).

BNSF states in its Reply that *St. Louis S.W. Ry. Arbitration Appeal* is inapposite to the facts here, but without meaningful explanation as to why. It suggests that enforcement measures may not be necessary because shippers will comply and that in any event the Board only has jurisdiction to address enforcement with respect to common carrier shippers. Rail carriers are obligated to define their rules with sufficient precision to allow shippers to know in advance of the guidelines that will be applied. In *Birmingham Rail and Locomotive Co. v. Aberdeen and Rockfish R.R.*, 358 I.C.C. 606 (1978), the ICC found a tariff provision specifying that a locomotive crane must be “in condition to move at speeds over 35 mph,” to be unlawfully vague. *Id.* at 606. The ICC explained that:

Rates and rules should be specific so that a shipper will be able to ascertain the correct rate to be charged. Policies should be specifically defined as well as published. When a

tariff provision is ambiguous and does not contain clear standards for application it will not lead to the security of uniformity and the same treatment to all shippers alike.

Id. at 608; *see also Radioactive Materials, supra*, 359 I.C.C. at 73 (railroads must “plainly state their tariffs in order to inform all parties of their plain meaning and to avoid controversy”) (internal quotation marks omitted).

Since BNSF has refused to define the enforcement mechanism that will be applied to the challenged tariff items, the Board should find the items to constitute an unreasonable practice due to their fatal incompleteness, as well as for all the other reasons articulated herein.

X.

IF THE COAL DUST TARIFF ITEMS ARE APPROVED, BNSF MUST REIMBURSE COAL SHIPPERS FOR THEIR REASONABLY INCURRED COMPLIANCE COSTS

In their Opening Evidence, Coal Shippers requested that if the Board approved the Coal Dust Tariff Items, the Board also order BNSF to publish an allowance tariff containing a schedule of reasonable sums BNSF would pay affected coal shippers to reimburse shippers for the reasonable expenses they incur in complying with these Items. Coal Shippers also requested that the Board reserve jurisdiction to address the reasonableness of the allowance schedule upon complaint by an affected coal shipper or shippers. *See Coal Shippers Op.* at 50-52.

BNSF argues that the Board lacks jurisdiction to grant this requested relief. BNSF Reply at 30-33. That is not the case. The Board clearly has the authority under 49

U.S.C. § 10745 to order the relief requested despite BNSF's assorted contentions to the contrary:

- BNSF claims that the Board's authority under 49 U.S.C. § 10745 is limited to addressing "the problem of discrimination, which is not an issue here." BNSF Reply at 31. BNSF misreads the statute. The text of 49 U.S.C. § 10745 applies whenever a shipper "directly or indirectly, furnishes a service related to or an instrumentality used in the transportation or service." *Id.* Discrimination claims are covered by a separate statute. *See* 49 U.S.C. § 10741 ("A rail carrier providing transportation or service . . . may not subject a person . . . to unreasonable discrimination.").

- BNSF claims that the Board has authority to set allowances only "where the railroad holds itself out as providing the transportation-related service at issue and the railroad includes the cost of that service in its rates." BNSF Reply at 32. The "transportation-related service at issue" in this proceeding is the maintenance of BNSF's PRB coal lines and, as BNSF itself has stipulated, it "includes the cost of that service in its rates."

- BNSF claims that the Board lacks authority to order BNSF to publish allowance schedules because the first sentence in Section 10745 permits, but does not require, a carrier to publish an allowance tariff. *See id.* ("[a] rail carrier . . . may establish a charge or allowance"). However, BNSF ignores the second sentence in Section 10745 which grants the Board the authority to prescribe maximum reasonable allowances. *See id.* ("The Board may prescribe the maximum reasonable charge or

allowance . . .”). The Board’s authority to prescribe allowances, as well as its general jurisdiction over rail practices, includes the authority to direct carriers to publish allowance tariffs. *See Bud Antle, Inc. v. United States*, 593 F.2d 865, 876 (D.C. Cir. 1979) (“the [Board] has the authority to order . . . carriers that have not already done so to publish an allowance”);²⁴ *General American Tank Car Corp. v. El Dorado Terminal Co.*, 308 U.S. 422, 430 (1940) (a shipper “may complain to the Commission, to the end that a proper allowance be ascertained and made effective by a schedule duly published”); *Paragon Refining Co. v. Alton & Southern R.R.*, 118 I.C.C. 166, 168 (1926) (finding the defendant carrier’s “refusal to provide by tariff publication for the payment of a[n] . . . allowance . . . an unreasonable practice” and prescribing “a reasonable allowance for the future”).

If the Board approves BNSF’s Coal Dust Tariff Items, Coal Shippers continue to request that the Board direct BNSF to publish a reasonable schedule of allowances, subject to Board review upon complaint.

²⁴ BNSF claims that this ruling in *Bud Antle* is no longer good law because the court addressed a predecessor version of Section 10745. BNSF points out that the predecessor version required rail carriers to establish allowances if a shipper provided a service related to transportation whereas the first sentence in the current version of Section 10745 provides that a rail carrier “may” establish allowances. BNSF Reply Evidence at 32-33. The Board’s authority to order BNSF to publish allowances does not arise under the first sentence of Section 10745, so BNSF’s argument is not germane. The Board’s power to order BNSF to publish an allowance tariff arises in connection with the second sentence in Section 10745 setting forth the Board’s power to prescribe allowances, as well as its general authority to regulate rail practices under 49 U.S.C. § 10702(2). Also, contrary to BNSF’s claims the D.C. Circuit did not reach this issue in *North American Freight Car Ass’n v. STB*, 529 F.3d 1166, 1180 n.14 (2008) (“we need not and do not decide whether section 10745 imposes an affirmative obligation on a railroad to establish a charge or allowance”).

XI.

IF THE COAL DUST ITEMS ARE APPROVED, THE BOARD SHOULD RULE THAT BNSF MAY NOT DENY SERVICE FOR FAILURE TO COMPLY WITH THESE ITEMS

As a common carrier, BNSF is obligated to provide service to rail shippers upon reasonable request. 49 U.S.C. § 11101(a). The service provided must be adequate to meet the shipper's needs. The requirement that service be adequate is "a part of the general definition of common carrier obligations." *Granite State Concrete Co. v. STB*, 417 F.3d 85, 92 n.10 (1st Cir. 2005) (citing *Nat'l Grain and Feed Ass'n v. United States*, 5 F.3d 306, 311 (8th Cir. 1993) and *Wales Transp., Inc. v. ICC*, 728 F.2d 774, 780 n.9 (5th Cir. 1984)).

It is clear that economic considerations are at the heart of BNSF's efforts to force coal shippers to reduce coal dust. Notwithstanding BNSF's and UP's claims that it is not practical to continue to deal with coal dust utilizing traditional maintenance of way techniques, actual experience in the PRB demonstrates that there can be no serious question that BNSF is capable of maintaining its roadbed in the PRB in a safe and adequate condition using such techniques. As discussed in Section I.A.1. of Coal Shippers' Opening Evidence, this is not a safety matter. Coal Shippers Op. at 14-17. If a train exceeds the maximum IDV.2 standards that BNSF has set in the Coal Dust Tariff Items, the roadbed will not be rendered unsafe for the movement of traffic over BNSF's lines. Nor will additional trains failing the standard have that effect. Since the May 2005 derailments (which were caused by extensive deferred maintenance), there have been no further derailments which have been claimed to be caused by coal dust. McDonald V.S.

at 7-8. Obviously, except for very limited tests, coal trains have not been sprayed during the intervening years.

Relevant case law rejects the notion that carriers may rely on economic considerations in determining whether to comply with their common carrier service obligations. *See, e.g., Ethan Allen, Inc. v. Maine Cent. R.R.*, 431 F. Supp. 740, 743 (D. Vt. 1977) (“[a] railroad may not, for example, justify a refusal to provide service solely on the grounds that to continue to provide service would be inconvenient or less profitable”); *General Foods Corp. v. Baker*, 451 F. Supp. 873, 875 (D. Md. 1978) (railroads “may not, on their own authority, refuse to maintain service when it becomes inconvenient to do so or because profits are declining”).

In one case regarding the impropriety of basing service decisions on economic considerations, *Pejepscot Industrial Park, Inc., d/b/a Grimm Industries – Petition for Declaratory Order*, STB Finance Docket No. 33989 (STB served May 15, 2003), the Board emphatically rejected the suggestion that a carrier could rely upon profitability levels to decide for itself whether it must comply with its common carrier obligation:

Respondents cannot lawfully make fulfilling their statutory obligations contingent upon whether they think it is “worth it” to do so. Rather, a carrier must adhere to its statutory obligations even if it suffers hardship in so doing. See, e.g., Decatur County Comm’rs v. Surface Transp. Bd., 308 F.3d 710, 715 (7th Cir. 2002) (“[railroads] may not refuse to provide service merely because to do so would be inconvenient or unprofitable”) (citing *G.S. Roofing Prods. Co. v. Surface Transp. Bd.*, 143 F.3d 387, 391 (8th Cir. 1998)); *Classification Ratings on Chemicals, Conrail*, 3 I.C.C.2d 331, 337-38 (1986) (Classification Ratings)

(railroads may not avoid their obligation to provide rates or service because the commodities in question are hazardous and, if not handled safely, could potentially expose the carriers to substantial financial liability).

Id. at 12-13 (emphasis added).

In a situation where coal trains are found by BNSF to exceed its maximum IDV.2 standards, the only possible adverse effects (assuming for the moment, contrary to fact, that the measurement methodology and standard were scientifically valid) would be additional dust on the roadbed which might, if allowed to accumulate over a long period of time, require continued ballast cleaning at current levels. In other words, there would be no short term impacts that could possibly warrant a refusal to continue to operate the offending train(s) or other trains in service for the same owner/lessor.

The rail movement of coal is of critical importance to the nation's economy. Coal serves as the most prevalent fuel for electricity generation and its reliable delivery from coal mines to power plants is vital to the integrity of the electric system. Indeed, the Board acknowledged at the outset of this proceeding "the vital role transportation of coal by rail plays in the nation's energy supply and the economy in general." (STB served Dec. 1, 2009) at 1. There can be no justification for refusing to provide coal transportation service on the basis of non-compliance with BNSF's challenged tariff items. Even though BNSF has not defined its enforcement measures for failure to comply, it is clear from its description of its proposed framework for enforcement that it "reserve[s] the right to decline to provide service" BNSF Op. at 27. In accordance with the statutory obligations and precedent discussed above, the Board

should rule that BNSF does not have the right to deny service for failure to comply with BNSF's coal dust tariff items.

XII.

IF THE COAL DUST TARIFF ITEMS ARE APPROVED, THE BOARD SHOULD FIND THAT THESE ITEMS, AND BNSF'S CORRESPONDING JOINT LINE OPERATING RULES, DO NOT APPLY TO UP OR TO UP COAL SHIPPERS

As Coal Shippers pointed out in their Reply Evidence, BNSF and UP disagree over BNSF's authority to apply the Coal Dust Tariff Items to UP and to UP trains moving on the Joint Line. BNSF claims it can force UP, and UP shippers using the Joint Line, to comply with the Coal Dust Tariff Items "as soon as practicable" because BNSF has established a Joint Line Agreement operating rule setting forth these demands. *See* BNSF Op. at 26.

UP's position is that BNSF's operating rules contain no enforcement mechanisms but "[s]hould BNSF modify its operating rules in the future to provide that it can stop trains or otherwise interfere with their operations . . . and then apply the rule in a manner that interferes with Union Pacific's contractual or common carrier obligations to its customers, Union Pacific will seek immediate relief, challenging the rules and their application." UP Op. at 20.

Coal Shippers request that the Board hold that the Coal Dust Tariff Items, if approved, apply only to coal shippers for whom BNSF is providing common carrier service on the Joint Line or the Black Hills Line. Coal Shippers also request that the Board hold that BNSF cannot enforce "operating rules" governing the application of the

Coal Dust Tariff Items to UP, and to UP coal shippers, unless and until the Board first permits shippers to file comments, in a separate proceeding, concerning the legality of BNSF's actions under the Joint Line Agreement, and, after receiving this input, decides to permit (or not permit) BNSF to take this action or to require that the terms of the Joint Line Agreement be amended.²⁵

CONCLUSION

Coal Shippers respectfully request that for all the reasons provided in the Coal Shippers' submissions, the Board rule that the challenged Coal Dust Tariff Items constitute an unreasonable practice and direct BNSF to cancel them.

²⁵ {

} Coal Shippers note that the Board's predecessor approved the terms of the Joint Line Agreement in Finance Docket No. 29066, and the Board has continuing jurisdiction over the Agreement.

Respectfully submitted,

By: 

C. Michael Loftus
Christopher A. Mills
Frank J. Pergolizzi
Andrew B. Kolesar III
Slover & Loftus LLP
1224 Seventeenth St., N.W.
Washington, D.C. 20036
(202) 347-7170

*Attorneys for Concerned Captive
Coal Shippers*

Dated: June 4, 2010

By: 

William L. Slover
John H. LeSeur
Peter A. Pfohl
Slover & Loftus LLP
1224 Seventeenth St., N.W.
Washington, D.C. 20036
(202) 347-7170

*Attorneys for Western Coal
Traffic League*

CERTIFICATE OF SERVICE

I hereby certify that this 4th day of June, 2010, I have caused the forgoing to be served via first-class mail, postage prepaid upon counsel for BNSF Railway Company and the Arkansas Electric Cooperative Corporation. I further certify that this 4th day of June, 2010, I have caused redacted, public copies of the forgoing to be served via first-class mail, postage prepaid upon the parties of record to this case.

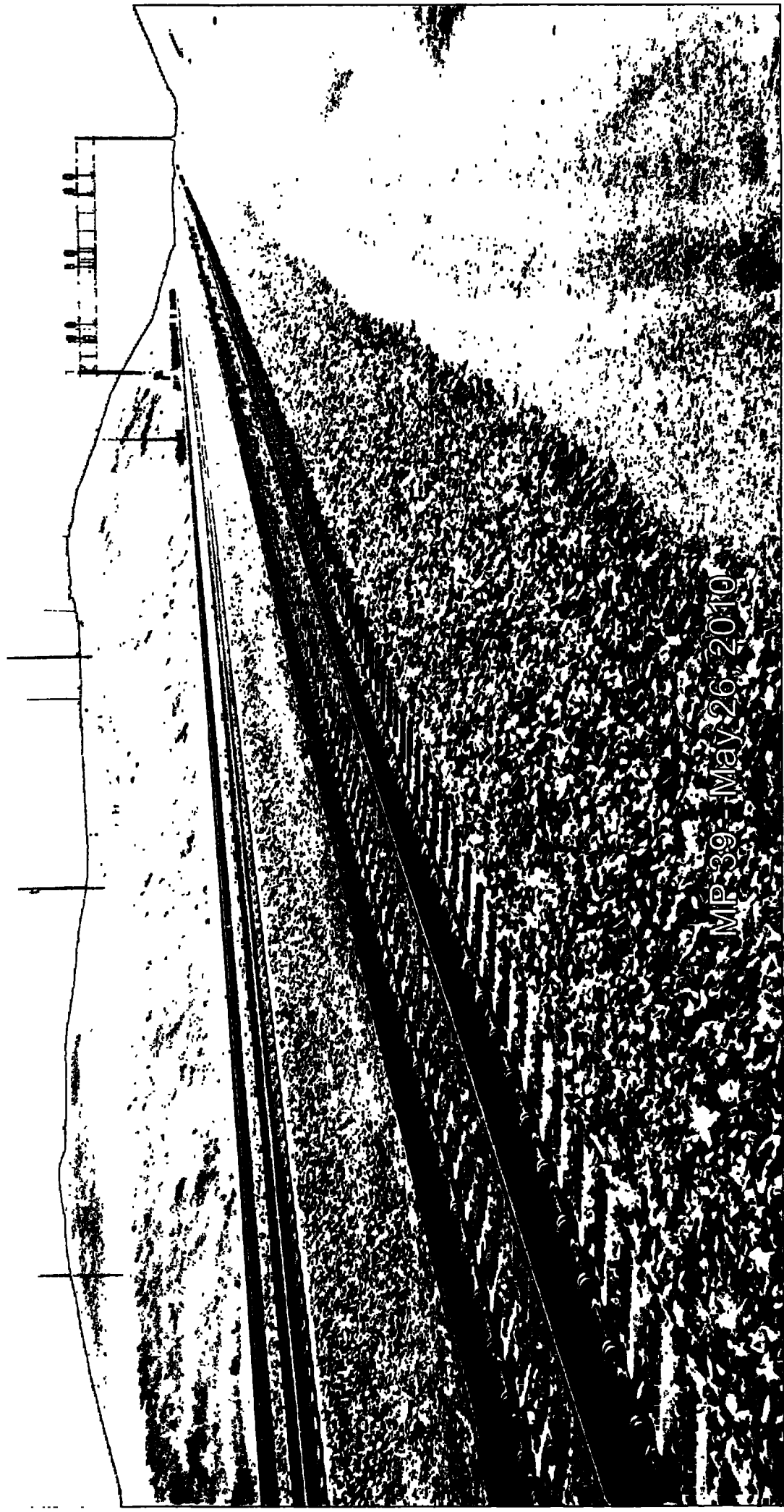


Andrew B. Kolesar III

Counsel's Exhibit 1

REDACTED

MP 29.99 - May 26, 2010



MP 39 May 26, 2010

MP 59.3 - May 26, 2010



Counsel's Exhibit 3

REDACTED

McDonald

REBUTTAL VERIFIED STATEMENT OF RICHARD H. McDONALD

My name is Richard H. McDonald. I have previously submitted two verified statements in this proceeding on behalf of the Western Coal Traffic League and the Concerned Captive Coal Shippers ("Coal Shippers"). My prior statements were included with the Coal Shippers' Opening Evidence and Argument filed March 16, 2010, and their Reply Evidence and Argument filed April 30, 2010.

The Coal Shippers have asked me to respond to the reply verified statements by BNSF witnesses VanHook, Sloggett, and Smith and the verified statement by Union Pacific ("UP") witness Dexter McCulloch that were submitted with BNSF and UP's Reply Evidence and Argument in this proceeding. In particular, I will respond to these witnesses' testimony to the effect that coal dust cannot and should not be dealt with through current track maintenance procedures and that the coal dust problem has risen to "crisis" proportions on the Joint Line and the other principal lines used by BNSF and UP to transport coal out of the Powder River Basin ("PRB").

I. There is No Coal Dust Crisis in the PRB

The principal thesis of BNSF's and UP's reply evidence is that the alleged coal dust problem has reached crisis proportions, cannot be addressed by "increasing" the frequency of track maintenance procedures such as undercutting, and could lead to an unacceptable risk of service interruptions if not addressed by measures to

curtail the emission of coal dust from loaded trains rather than continuing to let it fall onto the track structure.¹ In this regard BNSF's counsel go so far as to claim that it is now "impossible" to deal with coal dust accumulation through normal maintenance (Reply Arg. at 12) – an assertion that is not made by any of BNSF's witnesses, presumably because it simply is not true.

BNSF's statements appear to me to represent an attempt to scare the Board into concluding that if the coal dust issue is not addressed by additional measures to prevent dust from being emitted from loaded railcars (*e.g.* through the use of dust suppression surfactants applied at the mine), increasing PRB coal traffic volumes present a significant risk that derailments such as the two that occurred in May of 2005 will recur, thus disrupting the PRB coal supply chain. This kind of implication is belied by what has occurred on the Joint Line and other coal lines emanating from the PRB since the 2005 derailments.

Since the 2005 derailments, as BNSF's and UP's witnesses have detailed, BNSF has stepped up maintenance activity on the Joint Line, including an increased frequency of undercutting and shoulder ballast cleaning, in belated recognition that coal dust should not be allowed to accumulate to the extent it was allowed to in the years prior to 2005. The result is that since the 2005 derailments, coal traffic has moved without incident in terms of derailments or other safety problems resulting from coal dust

¹ See, *e.g.*, BNSF Counsel's Reply Argument ("Reply Arg.") at 2-3; VanHook Reply V.S. at 24; Sloggett Reply V.S. at 8-10.

accumulation. In other words, the railroads' current, increased maintenance activities related to the removal of coal dust appear to be working.

As I indicated in my Reply Verified Statement, it is a fundamental principle of railroading that increasing traffic volumes on any line will require increased maintenance activity of all kinds. The increased volumes of PRB coal traffic over the past ten years certainly have increased the need for maintenance, including undercutting to remove coal dust. However, the Joint Line and other nearby lines have considerably more capacity than they did in 2005, as a result of the addition of a third (and at some locations a fourth) main track on the Joint Line and a second main track on other BNSF and UP lines. Increasing traffic volume drives additional maintenance needs which together drive a need for additional capacity to accommodate maintenance windows.² Notwithstanding the railroads' claim of service disruptions, they have been able to transport record PRB coal volumes at record average train velocities since 2005.³ Although the current economic downturn appears to be ending, current indications are that PRB coal traffic volumes are unlikely to increase in the future at a rate remotely approaching what occurred between 2000 and 2008.⁴

² BNSF Witness Smith describes the increased need for maintenance windows to accommodate additional undercutting caused by the accumulation of coal dust. Smith Reply V.S. at 2-8. More maintenance windows are needed for all maintenance activities, driven by increased traffic volumes. The use of 25-foot track centers for the additional main tracks that have been installed in this decade minimizes the impact of maintenance windows on train operations, which affect only the specific track being maintained at the specific location where the maintenance is occurring. Trains on other tracks can move past the maintenance zone at normal speeds.

³ See my Reply V.S. at 5-6.

⁴ *Id.* at 7.

II. Coal Dust Can Be Dealt With Through Normal Maintenance procedures

BNSF's Witness Sloggett and UP's Witness McCulloch assert that coal dust accumulation cannot be adequately dealt with through normal maintenance procedures due to these railroads' "discovery" since 2005 that the heavy volume of PRB coal traffic requires expanded maintenance (in the form of undercutting and ballast cleaning at greater frequencies than previously thought), and because coal dust accumulation in the ballast is not always visible to the naked eye. Sloggett Reply V.S. at 2-7; McCulloch V.S. at 9-11. In essence, Messrs. Sloggett and McCulloch are claiming that increased undercutting and ballast cleaning due to increasing coal traffic volumes and the concomitant increased coal dust emissions from passing trains are not encompassed within "normal" maintenance procedures.

I disagree. The railroads appear to be suggesting that it is not normal practice to plan maintenance based on the known or anticipated operating characteristics of the trains that are running over a given line. Here, we are dealing with a line that is dedicated to the movement of heavy-axle-load unit coal trains. It has always been the case that these coal trains have produced coal dust as well as other ballast contaminants such as breakdown of ballast and concrete ties due to mechanical forces, brake shoe dust, and traction sand. And it has always been the case that the coal dust and other contaminants accumulated in the ballast, thereby necessitating a plan for ballast cleaning and/or undercutting. BNSF and UP effectively assume that coal dust accumulation alone dictates the amount and pace of ballast maintenance activity that will be required. Yet

they have not presented any analyses to establish that this is correct. Even BNSF's Witness VanHook acknowledges the need to understand the nature and amounts of other ballast contaminants in order to assess the impact of coal dust. "To assess the impact of coal dust in ballast, it is also important to know what other contaminants are present and the amount of the other contaminants." VanHook Reply V.S. at 11. It is equally important to understand the rate of accumulation of other contaminants. For example, if ballast breakdown from continual pounding by heavy coal trains is occurring at rates that result in ballast fouling by this contaminant which requires undercutting every 6 years,

{

}

Another defect in BNSF's analysis is that when considering what "normal" maintenance plans would be for the Joint Line, it is entirely inappropriate to compare the maintenance required on that line to the maintenance required on other non-comparable lines (*i.e.*, lines that are not dedicated to high volumes of heavy-axle-load coal trains and do not require as much maintenance in general).

It is thus highly misleading for the railroads to suggest that the presence of coal dust on the Joint Line has required "increased" maintenance above and beyond what is "normally" required on other lines. The railroads should have known that as the frequency of heavy coal trains increased on these lines, so too would the need for additional maintenance windows to address the wear and tear caused by the additional trains, including the need to clean/undercut and also replace the ballast on a schedule that more properly reflected the higher tonnage levels. Instead, the internal BNSF and UP

documents produced in discovery reflect that {

}

despite the ever-increasing number of coal trains being transported on the Joint Line in the years leading up to May 2005.

An example of this problem was discussed in Appendix B to the Coal Shippers' Opening Evidence and Argument ("Appendix B"). Appendix B {

}

The railroads' argument that coal dust is particularly pernicious because its accumulation in the ballast cannot always be seen by the naked eye is unconvincing.

First, as I indicated in footnote 2 on page 3 of my Reply V.S., coal dust is visible at many locations and can be seen blowing off passing coal trains. This means it is not necessary

to see coal dust in the ballast to know that it is accumulating and that remedial maintenance must be undertaken. Second, and perhaps more important, coal dust and other contaminants do not accumulate uniformly over the entire Joint Line (or any other line), and needed undercutting frequencies are not uniform. As the BNSF and UP engineering witnesses have detailed, more coal dust tends to accumulate where the trains pass over switches and bridges than elsewhere. This occurs because the surface of track tends to become irregular over time where trains change speed when diverting through switches, and also when trains operate over bridges where they transition from track supported by a flexible subgrade to a rigid track structure. All of this results in more vibrations (shaking) of loaded coal cars. Thus, relatively speaking, more coal dust tends to escape from loaded cars when they pass over switches and bridges. This fact is confirmed by the railroads' evidence concerning the accumulation of coal dust at switches and bridges and the need for more frequent undercutting at such locations. Sloggett Reply V.S. at 4, 9.

At pages 8-9 of his Reply V.S., Mr. Sloggett provides examples of locations on the Joint Line where coal dust has built up rapidly since the ballast was last removed. Again, most of these locations are near transitional areas, so it is not surprising that coal dust has accumulated more rapidly than at other locations. These are all isolated instances, and BNSF does not appear to have performed any disciplined analysis of the rate at which coal dust, and equally important, other ballast contaminants accumulate on the various parts of the Joint Line (or elsewhere in the PRB area, for that matter).

BNSF Witness Smith also states that BNSF performs maintenance activities on its PRB lines that are related to coal dust more frequently than it would under “normal” conditions (by which I presume he means on lines that do not carry a high volume of PRB coal traffic. Smith Reply V.S. at 3-4. Mr. Smith’s testimony is long on broad statements, but short on details. For example, he states that approximately 80% of maintenance windows are for “coal dust-related maintenance work” (*id.*), but he provides neither support for this figure nor details or definition of what BNSF deems coal-dust related.

III. The Principal Cause of the 2005 Joint Line Derailments Was Substandard Maintenance

In its Reply filing BNSF continues to insist that the Joint Line was well-maintained prior to the 2005 derailments, and that the unexpected accumulation of coal dust was the principal cause of the derailments. I addressed this issue in both of my earlier verified statements. Regardless of the level of BNSF’s knowledge about the extent and supposedly pernicious effects of accumulated coal dust, it is clear that coal dust has been blowing off loaded trains on the Joint Line for many years, that coal dust has long been known to cause problems if it and other fines are allowed to accumulate in the roadbed, and that BNSF did not adequately inspect or maintain the Joint Line in the years preceding 2005 as otherwise coal dust would not have been the problem in 2005 that BNSF claims.

BNSF’s claim that the Joint Line was well-maintained in the pre-2005 years is based in large part on the fact that Joint Line was able to accommodate the

substantial increases in coal tonnage that occurred in those years without incident, and that its maintenance personnel were unaware of the extent to which coal dust had accumulated in the ballast. These claims are an attempt to re-write history and to supply after-the-fact explanations for what BNSF and UP readily acknowledged was going on at the time. No rational railroad maintenance officer would assume that simply because traffic is increasing on a line, the line is properly maintained – nor did BNSF and UP officials make any such assumptions at the time. {

}

Documents produced by BNSF in discovery further demonstrate {

}

BNSF's argument that the Joint Line was in good condition prior to the 2005 derailments is also belied by {

} Without

proper inspections, it is difficult to assess the condition of a line realistically.

For example, {

}

{

}).

As further evidence that the Joint Line was properly maintained prior to the 2005 derailments, BNSF Witness VanHook points out that the number of FRA

⁵{

}

exceptions (citations for defective track conditions) per mile on the Joint line in 2003 and 2004 {
}

The use of this metric in this manner is inappropriate for several reasons.

First, the Joint Line is no “average” rail line. Track exceptions that are of concern on heavy axle, high density rail lines like the Joint Line may have far less significance on a lower-density line with few heavy-axle-load coal trains. In other words, fewer defects or exceptions per track mile can be tolerated on a high-volume, heavy-axle-load line such as the Joint Line than on other lines. {
}

Second, the frequency of exceptions relied upon by Mr. VanHook still reveals that coal trains traveling over the Joint Line in 2003-2004 were exposed to FRA-excepted track for much of their journey. An average coal train is approximately 1.5 miles in length. The data cited by Mr. VanHook indicates {

} To me, this is

an unacceptable level of defects for a line carrying such a high volume of heavy-axle-load traffic. Also, as the May 2005 derailments showed, an exception does not need to involve a lengthy segment of track to be a dangerous risk.

Finally, track exceptions can cause events that can contribute to coal dust accumulation. As trains travel over excepted track they may experience shaking, bumping, or other motion that causes displacement of coal in the cars and can lead to more dusting events.

IV. To the Extent Spraying Surfactants on Coal During the Loading Process Relieves the Railroads of Maintenance Expense, the Railroads Can and Should Pay for It.

In their reply filings BNSF and UP dispute the Coal Shippers' evidence as to the relative costs of controlling coal dust through track and roadbed maintenance versus spraying a surfactant on the coal as it is loaded into railcars at the mines (which appears to be the railroads' preferred solution). Mr. Thomas Crowley addresses the relative cost issue in his Rebuttal V.S. on behalf of the Coal Shippers. One thing is clear, however: to the extent coal dust is prevented from blowing off loaded coal trains as a result of the application of surfactants, less dust will accumulate and the railroads' maintenance activities and costs will be reduced. Because the railroads would be relieved to some extent from performing an activity (maintenance) that is a normal part of their performance of rail transportation, it seems appropriate to me that the railroads should bear all or a portion of the costs of applying surfactants.

I agree that in the case of the PRB, the logical place to apply surfactants is at the mines, during or shortly after the coal loading process. However, I strongly

disagree with the claim by BNSF's counsel that because PRB coal is loaded at mines that are off of the railroad property and not under its control, BNSF cannot undertake surfactant application at the mines – or, by implication, pay for it.⁶ Nothing prevents BNSF (or UP, for that matter) from entering into a contractual relationship with the mine operators under which the railroad reimburses the mine operators directly for the cost of applying surfactants as well as a portion of the capital cost for related infrastructure. BNSF and the PRB mine operators have other direct contractual arrangements, such as arrangements for the construction of (and payment for) the tracks used to load coal trains, and arrangements under which loading contractors actually move trains through the coal loading process, with the railroad paying for the cost of the contractor since this procedure results in railroad crew savings because the train crew does not have to remain with the train during loading but can be moved to another train for immediate departure.

In short, there is nothing to prevent BNSF and/or UP from reimbursing the mine operator directly for the cost of applying surfactants. Since they are the parties that would enjoy a reduction in their costs as a result of the spraying, this would align the costs and benefits and help to ensure that the most economic practice is pursued.

⁶ BNSF Reply Arg. at 29. I note that none of BNSF's (or UP's) witnesses provide testimony supporting this claim by counsel.

VERIFICATION

I, Richard H. McDonald, verify under penalty of perjury that I have read the foregoing Rebuttal Verified Statement and know the contents thereof; and that the same are true and correct. Further, I certify that I am qualified and authorized to file this statement.


Richard H. McDonald

Executed on: May 27, 2010

Reistrup

VERIFIED STATEMENT OF PAUL H. REISTRUP
Finance Docket. No. 35305

I. Background and Qualifications

My name is Paul H. Reistrup. I am a consultant on rail operations and engineering matters. My address is 8614 Brook Road, McLean, VA 22102.

I have 50 years of experience in railroad operations (including rail car management), engineering, marketing and management. I have occupied engineering, operating and executive positions with CSX Transportation, Inc. ("CSXT") and its predecessors, including Assistant Division Engineer, Trainmaster, General Yardmaster and Superintendent of Car Utilization and Distribution in the late 1950's and 1960's. I have served in several senior executive positions at the Illinois Central Railroad, including Vice President-Passenger Service, Vice President-Intermodal Service, and Senior Vice President-Traffic. I have also served as President of two railroads: Amtrak and the Monongahela Railway (an eastern coal-carrying railroad). In addition, I have consulted for a number of years on rail operations and management matters, including service with R.L. Banks & Associates, Inc., and as Vice President of the rail division of the international engineering firm Parsons Brinckerhoff.¹

II. Open Top Railcars and Commodities

Western Coal Traffic League and the Concerned Captive Coal Shippers have asked me to address certain comments from the Department of Transportation and

¹ A complete copy of my curriculum vitae is included as Attachment No. 1.

Union Pacific Railroad that suggest that the coal is the only commodity that escapes from railcars while in transit. This is not the case. Other commodities also escape from open top railcars.

During my many years of direct railroad operating experience and management, including overseeing all car operations for Illinois Central, I personally observed a variety of products that escape open top railcars in addition to coal and coal dust, including: wood chips, iron ore pellets, ballast, ballast dust, sand, gravel, crushed rock, crushed rock dust, other aggregates, and construction and demolition debris. Such occurrences were a regular part of operating the railroads I worked for and no special maintenance charges were assessed due to the escaped material.

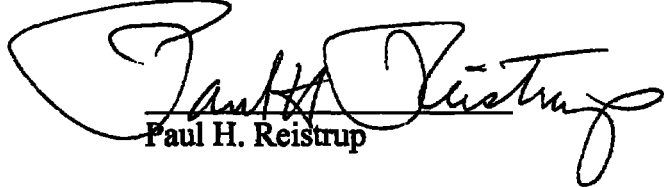
I understand that Union Pacific has asserted that it requires netting for wood chip cars. However, I am not aware of any other railroads that employ this practice, nor am I aware of any remedial measures that any railroads employ to keep the materials listed above in their railcars, except that some railroads transport sand in covered hopper cars.

I also note that the critical consideration, and the primary standard employed by every railroad that I ran or worked for, was that the goods be loaded in accordance with industry safety standards. In other words, if a car was properly loaded in accordance with safety requirements for the particular car type, the car would move on my railroad. By virtue of the car design(s) and the goods involved (as noted above),

some materials did escape cars, but that was not an impediment unless the car, as loaded, did not meet safety standards. Coal has been loaded in open-top railcars for many years in the same manner it is presently loaded at the Powder River Basin mines (with which I am familiar), although a requirement for profiling the top of the coal in the railcars has recently been implemented at all of the PRB mines. As long as the loaded car does not exceed the applicable gross weight limit, there has never been any suggestion that loading coal in this manner does not meet all applicable safety standards.

VERIFICATION

I, Paul H. Reistrup, verify under penalty of perjury that I have read the foregoing Verified Statement and know the contents thereof; and that the same are true and correct. Further, I certify that I am qualified and authorized to file this statement.



Paul H. Reistrup

Executed on: June 2, 2010

**PAUL H. REISTRUP
CONSULTANT**

Biographical Profile

Date of Employment by CSX (or predecessor): July 1, 1997

Place of Birth: Sioux City, Iowa

**Education: B.S., Engineering, United States Military Academy,
West Point, NY 1954**

Chronology of Employment:

- 1959 to 1961 Assistant Division Engineer, Baltimore and Ohio Railroad**
Infrastructure maintenance including track, bridges, signals and buildings on a mountain territory and later on high speed Division between New Castle, PA and Pine Jet (Chicao) IL.
- 1961 General Yardmaster, B & O Railroad**
In charge of 1000 car classification yard at Fairport Harbor, Ohio, serving coal transshipment to Lake boats, grain processors and chemical customers. Supervised around the clock yardmasters and switch engines.
- 1961 to 1963 Trainmaster, B&O Railroad**
Pittsburgh, PA headquarters for territory between Cumberland, MD and New Castle, PA plus line to Wheeling, WV. Supervised train crews of coal, merchandise, intermodal and passenger (including commuter) trains over generally mountain territory.
- 1963 Superintendent of Car Utilization and Distribution**
In charge of system distribution of some 60,000 freight cars consistent with ICC regulations. Responsibility included passenger train movement orders and related assignment of coach, sleeper, diner, RPO, mail and express cars.
- 1964 to 1966 Director of Passenger Service, B&O/C&O Railroad**
Selected to head restructured passenger department to include pricing/marketing, operations, mail, express and dining services. Became joint C&O Railway after control when responsibility expanded to include dining and cabin (sleeping room) service on three cross lake car ferry routes.
- 1966 to 1967 Assistant to Vice-President – Executive Department, B&O/C&O Railroad**
Selected by Railroad President to be groomed for key positions in Coal Department. During process traveled to all C&O/B&O mine loading

locations that produced more than 1000 tons per day, numbering more than 100 operations in total.

- 1967 to 1968** **Vice-President – Passenger Services, Illinois Central Railroad**
Elected to form integrated operations, marketing, pricing, mail and express, dining and commuter department. Task was to reduce intercity trains by one half and implement improvement program on electrified Chicago commuter operation to include funding and replacement of 40 year old equipment on 215 trains. Goal achieved in 18 months to meet commitment.
- 1969 to 1970** **Vice-President – Intermodal Service, Illinois Central Railroad**
Formed new department to develop emerging intermodal business of truck trailers and containers on flatcars. Initiated very commercially successful dedicated intermodal trains on passenger train schedules and led construction of four new intermodal terminals (exchanges) known as “IMX”.
- 1970 to 1975** **Senior Vice-President – Traffic, Illinois Central Gulf Railroad**
Responsible for all freight revenue, sales, marketing, pricing, coal traffic and Industrial Development. Continued to be in charge of intermodal as that department was consolidated. Elected to ICRR Board of Directors.
- 1975 to 1978** **President and CEO, Amtrak**
Elected in Jan. 1975 to become Amtrak’s second President and CEO. The operation then can best be described as horrible. Made it safe, led huge acquisition of equipment, selected locomotives that stayed on the track and against formidable opposition achieved acquisition of the most important element – The Northeast Corridor. Shared Penn Station and New York City with Long Island RR and began enduring relationship with Commuter Agencies, including MBTA, Metro North, what became Jersey Transit, SEPTA and MARC. Presided over all related labor union related transitions.
- 1978 to 1988** **Vice-President R.L. Bank & Associates**
Number Two in the Firm during the period of fuel “panic” and resulting switch from oil to coal power plants. Resurgence of commuter rail (VRE) and light rail (Baltimore resounding success) involved my role as “Project Manager”.
- 1988 to 1992** **President, Monongahela Railway Company**
Subsequent to a six year marketing role as acting Chief Traffic Officer under contract with RLBA was elected as President and CEO of CSX/CR/PLE owned heavy haul coal railroad. Tonnage tripled during 10 year role as chief coal marketing officer. Two new mines opened subsequent to convincing coal operators output could (and was) flow effective. Role ended as President of a Conrail subsidiary.

- 1992 to 1994** **General Manager, Railroad Development Corporation**
Led Argentina through safe transition from government railroad to commercial enterprise of some 5000 miles. Startup was fully automated to U.S. safety standards since remaining employees had tenure for life.
- 1994 to 1997** **Vice-President, Parsons Brinckerhoff**
Initially engaged to lead PB's international rail effort because of the successful Argentina endeavor. Trained senior management (Chairman, VC, General Managers) of new Cairo, Egypt subway as experienced railway managers to lead subway constructed to BART (San Francisco) and Washington, DC Metro Rail automated standards. Resulting transition was safe.
- 1997 to 2002** **Vice-President – Passenger Integration, CSX Transportation, Wash., DC**
Was requested to rejoin CSX "family" to support Conrail integration of passenger with freight. Critical focus was NEC and the multitude of commuter rail interfaces plus Amtrak as CSX was the largest operator by number of trains and train miles.
- 2003** **Consultant, CSX**
From retirement from CSX to 31 Aug. 2003 served CSX to introduce chosen successors to all passenger entity key players. Smooth transition was the goal.
- 2003 to present** **President, Paul H. Reistrup & Associates**
Consultant on an hourly case fee basis. No retainer cash fee.

Business, Civic and Professional Affiliations:

- Transportation Research Board**
Appointed Member Emeritus – 2001
Chair-Committee AR030, Railroad Operating Technologies (AREMA)
- American Railway Engineering and Maintenance Association (AREMA)**
- Association of Railway Superintendents**
- Board Member – J.W. Barriger III Library**
- Lexington Group (Railroad History)**
- Association for Transportation Law, Logistics and Policy**

BEFORE THE
SURFACE TRANSPORTATION BOARD

FINANCE DOCKET NO. 35305

ARKANSAS ELECTRIC COOPERATIVE CORPORATION –
PETITION FOR A DECLARATORY ORDER

**REBUTTAL VERIFIED STATEMENT OF
MARK J. VIZ, Ph.D., P.E.**

ON BEHALF OF
WESTERN COAL TRAFFIC LEAGUE
AND
CONCERNED CAPTIVE COAL SHIPPERS

Redacted, Public Version

DATED: JUNE 4, 2010

1. Introduction and summary of conclusions.

- a. My name is Mark J. Viz. I am the same Mark J. Viz who submitted a verified statement in this proceeding on March 16, 2010, and a reply verified statement in this proceeding on April 30, 2010, on behalf of the Western Coal Traffic League and Concerned Captive Coal Shippers (collectively "Coal Shippers").
- b. I have been requested by the Coal Shippers to review the reply verified statements submitted by two BNSF witnesses in BNSF's reply submission in this proceeding: Charles (Tony) Sultana, a Six Sigma Specialist in BNSF's Mechanical Department and G. David Emmitt, the President of the consulting firm Simpson Weather Associates ("SWA"). Both of these individuals address the studies and data that BNSF relied upon in developing its proposed coal dust emissions standards. In general, the statements presented by Mr. Sultana and Dr. Emmitt do not address in detail the many flaws in BNSF's studies and data, which I previously explained in detail in my verified statement and reply verified statement. Accordingly, I will simply incorporate by reference, and not repeat, the contents of my initial and reply verified statements in this rebuttal statement.
- c. Summarized briefly, the essence of BNSF's reply testimony regarding the use of the E-Samplers is that Coal Shippers are wrong to insist that BNSF and SWA were required to use a gravimetric filter (which is an EPA Federal Reference method) to determine the mass concentration of the particulate matter that passes through these samplers. According to BNSF's reply testimony, BNSF is not concerned with the actual amount of particulate matter (which they still assume to be completely coal particulate even though they have offered no proof to support this claim) being monitored by the E-Samplers, but instead, BNSF merely seeks to make "relative" observations of the different amounts of particulate that is allegedly emitted solely and completely by coal trains passing MP90.7. BNSF argues that since it is not attempting to measure actual quantities of coal

particulate, it is therefore not necessary to use a gravimetric filter to measure the particulate emitted by a given train.

- d. BNSF's reasoning continues that since the E-Samplers are calibrated by the manufacturer (Met One) on a regular basis (using latex spheres, not coal dust), the samplers produce reliable and consistent output data that permit BNSF and SWA to develop a "hierarchy" of "relative dustiness" among all coal trains that pass the samplers. Stated differently, BNSF contends that a linear relationship exists between the amount of particulate that is measured by the E-Sampler and the corresponding voltage (or "dust unit" as SWA calls it) that the E-Sampler provides as output. According to BNSF, doubling the amount of particulate passing through the E-Sampler will yield (approximately) a doubling of the voltage output from the E-Samplers' light sensors. BNSF concludes that the linearity of this relationship allows BNSF to rank the "dustiness" of individual coal trains without ever having to address the *actual* particulate mass and mass concentrations measured by the samplers.
- e. BNSF's arguments are mistaken, however. They are mistaken because the calibration Met One performs in and of itself is insufficient to account for the expansive range of variables that are needed to describe coal particulate when using a light scattering technique (such as used by the E-Samplers) to monitor concentration. They are also mistaken in that neither BNSF nor SWA have generated or produced any test data to support their claim of linearity between particulate concentration and output voltage from the E-Samplers.
- f. As described in greater detail below, BNSF bases its conclusions regarding the supposed linearity of the E-Samplers output signal on calibrations that Met One performs in a laboratory setting using small, uniformly (lightly) colored polystyrene spheres of a uniform size, shape and reflectivity. In this calibration procedure, Met One likely introduces a known mass of such spheres into a known

volume of sampling air and then draws that air through the E-Sampler's laser beam to then obtain voltages from the light that is reflected off the particles onto light-sensitive elements. Met One would then compare the output voltage from the light-sensitive elements to the known, actual concentration of test spheres that they had earlier introduced into the sampler. Met One would then adjust the internal "gain" of the electronics to establish a match between the output voltage and the actual concentrations. This procedure would be repeated using test spheres over a range of uniform sizes to then establish that a linear relationship exists between the output voltage and the actual concentrations.

- g. Significantly, however, there is a substantial body of relevant technical literature (from "real world" studies) that demonstrates that the ability of a light-scattering device such as an E-Sampler to yield linear and reliable results when measuring test spheres in a laboratory does not guarantee that the sampler will produce results that are likewise linear and reliable when measuring actual particulate matter, such as coal, of varying sizes, shapes and reflectivities. An E-Sampler that has been correctly calibrated using polystyrene test spheres could in fact fail to correctly output measurements (voltages) that would identify the relative "dustiness" of coal emissions from different trains because of the irregularity of the sizes, shapes and reflectivity of the coal particulate (and any other particulate that happens to be drawn through the E-Samplers at MP90.7). As my study for the NCTA has shown, the E-Samplers failed to consistently output correct measurements of coal particulate, and an analysis of the actual particulate concentration data compared to the E-Sampler output voltages showed that even though properly calibrated by Met One, a linear relationship did not exist between coal particulate concentration and output voltage. It is this fundamental inability to assure linearity when measuring real-world particulate matter that undermines BNSF's effort to rely upon the E-Samplers as they have been and continue to be used to provide "relative dust unit" determinations. As BNSF and SWA's claim of linearity is the cornerstone of their "relative dustiness" scheme, the inability to

assure linearity causes BNSF's "relative" ranking of coal train dust emissions to collapse.

h. A summary of conclusions presented in this rebuttal verified statement include:

- i. BNSF's claim that the "E-Sampler dust monitors used to monitor compliance with [BNSF's] coal dust standards are well suited to this task and are being used properly"¹ is not substantiated or supported by field test data, lab testing or any other studies that BNSF and/or SWA have provided in this proceeding. BNSF and SWA's central claim, that the output (voltage) signal from the E-Sampler is linearly proportional to the particulate concentration (i.e., mass per unit volume of sample air) being sampled is simply not substantiated or supported by any test data or related work performed and/or provided by BNSF, SWA { }. Since BNSF, SWA { } have not shown that this proportionality exists, which is a necessary condition they need to be able to support their claim that the E-Samplers are only used to measure "relative" dust, BNSF, SWA and Dr. Emmitt cannot state that the E-Samplers "are being used properly."
- ii. BNSF's claim that the "E-Sampler dust monitors used to monitor compliance with [BNSF's] coal dust standards are well suited to this task and are being used properly"² also is not correct because neither BNSF nor SWA have adequately addressed the variability found from the output of collocated E-Samplers. As with the linearity issue, BNSF and SWA rely on untested hypotheses and assumptions instead of defensible, repeatable scientific results to adequately address and reconcile inter-sampler variability.

¹ "BNSF Railway Company's Reply Evidence and Argument," p. 20.

² "BNSF Railway Company's Reply Evidence and Argument," p. 20.

- iii. BNSF and SWA, and more specifically, Mr. Sultana and Dr. Emmitt's claim that a detailed review and study of the relevant technical literature would have done nothing to inform them of problems they would encounter by using E-Samplers to monitor coal particulates in the manner that they have constitutes a flagrant disregard of relevant findings from research performed over the past 40 years. If this body of work had been consulted early in their efforts they likely would have identified numerous problems in their monitoring techniques and methods.
- iv. BNSF and SWA state that the IDV / IDV.2 concept and its calculation constitutes a "reasonable and practical"³ approach to monitor relative dust levels from passing coal trains. This conclusion is not supported by the data presented by BNSF and SWA as part of this proceeding, and it cannot be evaluated independently because BNSF and SWA believe that the technical community has little or nothing to offer in peer review. Their continued refusal to release the "code" used to calculate IDV / IDV.2 prevents any other party from being able to review and test the meaningfulness of the concept and its corresponding calculation.
- v. BNSF's assertions that the E-Samplers at MP90.7 are collecting "covariate"⁴ data of coal particulate deposited in the ballast at MP90.7 by passing trains is not supported by any scientific or engineering studies or other data that BNSF and/or SWA have provided.

2. BNSF's claim that the "E-Sampler dust monitors used to monitor compliance with [BNSF's] coal dust standards are well suited to this task and are being used properly"⁵ is not substantiated or supported by field test data, lab testing or any

³ "Reply Verified Statement of Charles Sultana," p. 3.

⁴ "Reply Verified Statement of G. David Emmitt," p. 3.

⁵ "BNSF Railway Company's Reply Evidence and Argument," p. 20.

other studies that BNSF and/or SWA have provided in this proceeding. BNSF and SWA's central claim, that the output (voltage) signal from the E-Sampler is linearly proportional to the particulate concentration being sampled is simply not substantiated or supported by any test data or related work performed and/or provided by BNSF, SWA {

}. Since BNSF, SWA { } have not shown that this proportionality exists, which is a necessary condition they need to be able to support their claim that the E-Samplers are only used to measure "relative" dust, BNSF, SWA and especially Dr. Emmitt, a self-described "research scientist," cannot state that the E-Samplers "are being used properly."

- a. BNSF Railway Company's Reply Evidence and Argument and the reply verified statements provided with it include a number of unsubstantiated claims regarding the suitability of the E-Samplers (as have been used by BNSF and SWA) for obtaining reliable data regarding the "relative dustiness" of passing coal trains.
 - i. "BNSF is using the E-Samplers to determine the *relative* dustiness of passing trains, not to determine the *absolute* amount of dust given off by a particular train. ... The [E-Sampler] filter and K-factor are only needed if the E-Samplers are being used to determine the absolute amount of dust in a sample."⁶
 - ii. "A voltage signal of 10X means that the sample has ten times the amount of dust as a voltage signal of X."⁷
 - iii. "For example, the E-Sampler can be used to determine that a particular sample of dust has five times as much dust as another sample. ... When the E-Sampler is used to measure the relative dustiness of a particular

⁶ "BNSF Railway Company's Reply Evidence and Argument," p. 23.

⁷ "BNSF Railway Company's Reply Evidence and Argument," pp. 23-24.

sample, there is no need to use the filter to translate the electronic signal into a unit of mass.”⁸

- iv. “On several occasions, SWA used filters to collect the material being measured by the E-Samplers. The material on the filters was inspected by SWA, as it has done for other clients for more than 20 years, under a microscope....”⁹
- v. “BNSF is making measurements of the relative dustiness of trains, therefore BNSF is only interested in the strength of the electric signal produced by the E-Sampler, which can be measured in relative ‘dust units’ without translating those dust units into specific measurements of mass.”¹⁰
- vi. {

}¹¹

- b. All of the above statements repeatedly point out that BNSF and SWA require that there be a unique and reliable relationship between the concentration of particulate matter and the corresponding electronic output signal of the E-Sampler for any of their claims to hold true. But all BNSF and SWA, {
}, can do is make the same statement over and over again

⁸ “Reply Verified Statement of Charles Sultana,” p. 4.

⁹ “Reply Verified Statement of G. David Emmitt,” p. 11.

¹⁰ “Reply Verified Statement of G. David Emmitt,” p. 16.

¹¹ “Reply Verified Statement of G. David Emmitt,” {
}.

... none of them ever shows any lab test data, field test data, results from the literature ... anything ... to prove that their statements (assumptions really) are true. BNSF, SWA { } want us to believe that these statements regarding a unique linear relationship between the concentration and the output signal is true because they say so, not because they have the scientific results to prove it. This is not an “academic exercise” as Dr. Emmitt characterized my earlier criticisms in his reply statement ... it is a matter of legitimate, defensible science that must be shown to be repeatable and reliable. BNSF, SWA { } have not shown this to be the case.

- c. Consider the simple meaning and ramifications of the statements (i) through (vi) above. When receiving analog output data from the E-Samplers at MP90.7, SWA receives an output signal from each E-Sampler that corresponds to the reflected light intensity sensed by the internal photodiodes. This signal is a voltage, and it is recorded every five (5) seconds. SWA can call it a “dust unit” or “dust signal,” but the simple reality is that it is a voltage. Now, since SWA does not download or even reference any of the internal concentration data stored by the E-Sampler (and internally converted to units of mg/m^3), all SWA knows for any given sampling period is a table of voltages generated every five (5) seconds. SWA does not know if a 1.0 volt output reading corresponds to a concentration of 1 mg/m^3 , 10 mg/m^3 , 100 mg/m^3 , In a similar manner, BNSF and SWA do not know what any voltage output value corresponds to in terms of real units. SWA could attempt to make this correlation but it has not done so ... Dr. Emmitt’s statement (iv) above even asserts that SWA has used the E-Samplers with filters on many occasions, but they apparently have never attempted to compare the filter concentration results with the voltage output. BNSF, SWA { } claim is that they do not care what any particular voltage value compares to in terms of real particulate concentration, BUT they do care – and need it to be so – that there is a unique and reliable relationship between actual particulate

concentration and output voltage otherwise their claim that the E-Samplers measure “relative” dustiness is completely without merit.

- d. This then begs the question ... how does SWA { } establish that this unique, reliable and even linear ({ }) relationship between particulate concentration and output voltage exists? How does SWA { } create an “X-Y plot” to prove that there is a linear relationship between particulate concentration and output voltage if there is only one quantity to plot, i.e., voltage? What is the other quantity plotted against output voltage to prove linearity? The answer is that there is nothing because BNSF, SWA { } do not use filters or any other Federal Reference Method to establish a set of concentration values for comparison, and this is precisely why BNSF, SWA { } cannot prove that such a relationship exists.¹²

However, there are ways to discover what relationship exists between particulate matter concentration and the output voltage of the E-Sampler. One way is to use the E-Sampler with the 47-mm filters ... this is an EPA “Federal Reference Method” that is exactly what it says ... a “reference method” that provides reliable results to estimate the concentration of particulate matter that can then be compared with the output from a different sampling technique, such as the light-scattering technique used by the E-Sampler. {

¹² The term “Federal Reference Method” refers to a method approved by the US Environmental Protection Agency (“EPA”) to accurately determine particulate concentration values (see 49 CFR 53.1).

f. { }

}, it is clear that the E-Sampler voltage output itself cannot be used as a surrogate for estimating the actual mass or even the “relative” mass of sampled particulate matter. {

}. It is completely

unclear how BNSF, SWA { } can claim that linearity between the output voltage signal (the vertical axis in Figure 1) and particulate concentration (the horizontal axis in Figure 1) exists for this type of particulate matter. They claim that a linear relationship exists but they show nothing to support that claim; if it exists as they claim, then they have the responsibility to show the data.

- g. In addition to the data presented in Figure 1, a substantial number of technical papers describing “real-world” dust monitoring methods (not “academic exercises” as Dr. Emmitt falsely characterizes in his reply statement) that I have identified and reviewed establish that the accuracy of light scattering devices such as E-Samplers must be checked against some other Federal Reference Method to test the assumption of a linear output signal. For the purposes proposed by BNSF, calibration in a laboratory setting using latex test spheres is not a sufficient substitute for a Federal Reference Method. The uncertainty and variability associated with E-Sampler output not verified by comparison to a Federal Reference Method would prevent even relative conclusions from being drawn from the voltage output of the devices. In this regard, the relevant literature confirms that light scattering devices need to be rigorously investigated when sampling particulate that involves a wide range of particle sizes, shapes and refractive index. Notably, Dr. Emmitt even admits that these characteristics affect the amount of light that is scattered off of a particle.¹³ Yet Met One, according to its own sales brochure for the E-Sampler available at its internet site, states “Every E-Sampler is factory calibrated using polystyrene latex spheres of known index of refraction and diameter at multiple points to validate linearity.”¹⁴ The problem with relying solely on this laboratory calibration from Met One (as SWA does¹⁵) is

¹³ “Reply Verified Statement of G. David Emmitt,” p. 16, “The amount of light that is scattered off a particle depends on the particle’s size, shape, and refractive index.”

¹⁴ Reference Met One’s internet site, www.metone.com. This information has also been provided in Dr. Emmitt’s reply statement exhibit 2 errata.

¹⁵ “BNSF Railway Company’s Reply Evidence and Argument,” p. 24, “Specifically, BNSF and SWA decided to rely more heavily on calibration by the manufacturer than by carrying out field calibration.”

that mono-disperse polystyrene latex spheres are *not* coal particulates of varying size, shape, refractive index and particle size distribution. Ideally, using filters with the E-Samplers to calculate K-factors would address the differences between the sampling of these two particulate media, but SWA does not use filters and therefore does not calculate K-factors. Dr. Emmitt's earlier response to this deficiency completely misses this point, as reflected in his comments regarding "self-zeroing" and the fact that the "factory calibration is performed twelve times more often than the two-year time period recommended by the manufacturer."¹⁶ The factory calibration for output linearity is meaningless if mono-disperse latex spheres are always used instead of coal particulates representative of PRB coal.

h. Given the immediately previous statements, consider some of the following statements from relevant technical literature that involve "real-world" dust monitoring applications. A review of these publications and the techniques they recommend completely refutes BNSF's position "that there are no technical or academic studies that propose alternative monitoring approaches" and that reviewing such relevant literature is a "barely disguised excuse for doing nothing."¹⁷ In fact, disregarding these studies and others like them, as BNSF and SWA have, exhibits a certain scientific and engineering haughtiness that again is reflective of the approach BNSF and SWA have taken all along, i.e., "it is because we say so," not because we have scientific evidence.

i. From a "real-world" study of particulate matter sampling in British coal mines (using light scattering devices like E-Samplers) funded by British Coal: "Changes in the composition of the dust or in its size distribution can have considerable effects on the indicated mass concentration and, in the case of dust composition, the effect is not easily predictable. It is therefore essential to calibrate [light scattering (the paper uses trade names for

¹⁶ "Reply Verified Statement of G. David Emmitt," p. 19.

¹⁷ "BNSF Railway Company's Reply Evidence and Argument," p. 26.

specific devices)] monitors against appropriately size-selected gravimetric samples of the dust to be monitored and, to guard against changes in the dust characteristics with time, periodic checking of the calibration is considered necessary.”¹⁸

- ii. From a “real-world” study of particulate matter sampling in the Los Angeles Basin (using light scattering devices like E-Samplers) funded by the US EPA and the California Air Resources Board:¹⁹
 1. “The correlation between particle mass concentration and light extinction due to particle scattering has been used as the principle for ‘in situ’ monitoring of particle mass concentrations by instruments known as photometers or nephelometers [such as the E-Samplers] (Waggoner and Weiss, 1980; Thomas and Gebhart, 1994; White et al., 1994; Brauer, 1995). In general, this correlation depends on particle size, chemical composition and hygroscopicity (Scheff and Wadden, 1979; Lewis, 1981). For example, in studies conducted in the southwestern US, White et al. (1994) showed that *nephelometers reported less than half of the actual scattering by coarse particles. When this under-response was corrected for, the coarse particles were found to be responsible for approximately 25-35% of the total particle scattering.*” [emphasis mine]
 2. “Thomas and Gebhart (1994) evaluated the relationship between gravimetrically determined aerosol mass concentration and light scattering as a function of particle size using exclusively laboratory-

¹⁸ Roebuck, B., Vaughan, N.P., Chung, K.Y.K., *Performance Testing of the OSIRIS (Optical Scattering Instantaneous Respirable Dust Indicating System) Dust Monitoring System*, Ann. Occup. Hyg., Vol. 34(3): 263-279, 1990.

¹⁹ Sioutas, C., Kim, S., Chang, M., Terrell, L., Gong Jr., H., *Field Evaluation of a Modified DataRAM MIE Scattering Monitor for Real-Time PM_{2.5} Mass Concentration Measurements*, Atm. Env., Vol. 34: 4829-4838, 2000.

generated aerosols. The very limited field data of that study showed a fairly linear relationship between photometry and gravimetry, as long as ambient relative humidity is below 60% and *the aerosol size distribution based on mass is dominated by particles comparable to the wavelength of the light scattered by the particles.*" [emphasis mine]

3. "Our experimental results indicated that the aerosol mass median diameter (MMD) is the single, most important parameter in affecting the response of the [light scattering nephelometer]."
- iii. "Most of the [aerosol] sampling instruments are designed and calibrated at standard conditions, but in real applications, they are used in different situations in laboratory and field tests. The error can be so large that the investigators have to discard the test results. Unfortunately, sometimes it is not recognized by many applicators and the results are misleading. So it is critical to evaluate the sampling efficiency of aerosol instruments in real applications."²⁰
- iv. "The aspiration efficiency and the penetration efficiency affect the overall sampling efficiency of a sampling device. The factors affecting the overall sampling efficiency need to be examined in real particulate measurements."²¹
- v. "It was observed that there was substantial difference in the sampling performance between the aerodynamic particle sizer and laser particle counter [like a nephelometer]. The maximum difference was 700% for the particles in the size range of 0.7-1 μm . [my emphasis] In still air, the aerodynamic particle sizer has higher sampling efficiency than the laser

²⁰ Wang, X., Zhang, Y., Tan, Z., *Comparison of Different Instruments for Particle Concentration Measurements*, ASHRAE Trans., Vol. 111(part 2): 467-475, 2005.

²¹ Ibid.

particle counter in the size range of 0.5-20 μm . In windy air, however, the sampling efficiency of the aerodynamic particle sizer is less than that of the laser particle counter for large particle size range ($>5 \mu\text{m}$).”²²

- vi. “Laser spectrometers [another term for light scattering “nephelometers” which the E-Samplers are] are calibrated by different methods, of which the calibration by mono-disperse polystyrene latexes is the most widely used method. Spectrometer calibration by latexes leads to some errors due to imperfect manufacture of the latexes, time variation of the diameter of latex particles, their coagulation, and so on. In addition, a basic error in the calibration of any aerosol photoelectric spectrometer is connected with the fact that the intensity distribution function of light scattered by particles rather than the particle size distribution function is recorded.”²³

3. BNSF’s claim that the “E-Sampler dust monitors used to monitor compliance with [BNSF’s] coal dust standards are well suited to this task and are being used properly”²⁴ is not correct because neither BNSF nor SWA have adequately addressed the variability found from the output of collocated E-Samplers. As with the linearity issue, BNSF and SWA rely on untested hypotheses and assumptions instead of defensible, repeatable scientific results to adequately address and reconcile inter-sampler variability.

- a. In my reply statement, I stated: “In its 2009 Reply, BNSF states that it ‘collected data from thousands of trains to assist in formulating effective coal dust emission standards.’[] However, Mr. Sultana acknowledges in his opening verified statement that in studying the ‘variation’ in the E-Samplers used at MP90.7, BNSF ‘had nearly 400 data points showing simultaneous measurements from two e-

²² Ibid.

²³ Poluektov, P.P. and Timonin, V.V., *Alignment Errors of Aerosol Laser Spectrometers*, J. Appl. Spectroscopy, Vol. 60(1-2): 144-146, 1994.

²⁴ “BNSF Railway Company’s Reply Evidence and Argument,” p. 20.

samplers in the side-by-side tests.’[] By ‘variation,’ Mr. Sultana is referring to the different IDV / IDV.2 values calculated from the output of two E-Samplers placed side-by-side to attempt to measure particulate from the same source.[]” (footnotes omitted). BNSF produced in discovery in this matter {

}. From an engineering perspective, this remarkably small data set, especially when compared to representations made by both BNSF and SWA that thousands of trains have been monitored over a multiple year period, seems to be wholly inadequate to establish the basis for E-Sampler variability.

- b. BNSF states that “Years of data gathered by BNSF in its study of the coal dust problem, as well as confirmation from the manufacturer of the E-Samplers, show that the E-Samplers are well suited for [the purpose of identifying trains that emit dust in excess of the limits set out in BNSF’s emission standards].”²⁵ However, BNSF and SWA misrepresent this point in that the “years of data” have apparently only been used to endlessly calculate IDV / IDV.2 and thereby create a database of these values that they claim has significance for this issue. “Years of data” have not been used to address the variability between E-Samplers; in fact, it appears that { } pairs of IDV / IDV.2 data were suitable for use in a study of variability. Given the sparse data used to investigate variability and the lack of relying on any reference method to validate or at least check that the output signal of the E-Samplers is uniquely and reliably related to actual particulate concentration, BNSF and SWA could not reasonably conclude that they correctly account for sampler variability in their monitoring efforts.

²⁵ “BNSF Railway Company’s Reply Evidence and Argument,” p. 21.

c. Regarding the side-by-side tests BNSF and SWA performed to attempt to address variability between otherwise identical and collocated E-Samplers, both Mr. Sultana and Dr. Emmitt state that it is “uncontrollable” environmental factors that ultimately cause the variability, not inaccuracies in the E-Samplers or the light scattering method for this application. Mr. Sultana states: “Since dust particles are not distributed evenly in a sample of air, two different dust readings from a calibrated monitor of the same air sample may produce two different dust level readings.”²⁶ Dr. Emmitt states: “But any given sample will have varying particles and particle distribution, making it unlikely that two readings of the same air sample will produce exactly the same dust levels.”²⁷ {

}²⁸ Mr.

Sultana, Dr. Emmitt { } seem to have stumbled upon a well-documented phenomenon in the literature regarding particulate monitoring, namely, that the particular characteristics of the matter being sampled can add considerable variability to the monitoring method *UNLESS* certain actions are taken to account for these characteristics^{29,30} (reference the numerous technical literature citations already presented in this statement). These issues are well documented and well studied in the technical literature that Mr. Sultana and Dr. Emmitt seem to conclude should be consulted simply as academic exercises. The

²⁶ “Reply Verified Statement of Charles Sultana,” p. 5.

²⁷ “Reply Verified Statement of G. David Emmitt,” p. 18.

²⁸ “Reply Verified Statement of G. David Emmitt,” Exhibit 11 – { }.

²⁹ Buser, M.D., Parnell, C.B., Shaw, B.W., Lacey, R.E., *Particulate Matter Sampler Errors due to the Interaction of Particle Size and Sampler Performance Characteristics. PM10 and PM2.5 Ambient Air Samplers*, Air Pollution from Agricultural Operations III, Proceedings of the ASAE Agricultural Operations Conference, 45-61, 2003.

³⁰ Buser, M.D., Parnell, C.B., Shaw, B.W., Lacey, R.E., *Particulate Matter Sampler Errors due to the Interaction of Particle Size and Sampler Performance Characteristics: Background and Theory*, Trans. ASABE, Vol. 50(1): 221-228, 2007.

simple point is that this variability—whether from the E-Samplers or the matter being sampled or some combination of both—can be quantitatively addressed and incorporated in corrections to concentration output if certain steps are performed, especially if the E-Samplers are run using filters or are run side-by-side with other Federal Reference Method devices (as just about every other user of these devices does as documented in the literature). But all BNSF and SWA have at their disposal to attempt to quantify variability are streams of monitor output voltages. They even admit they have no idea how these output voltages correspond to real concentrations. This begs the question ... how can BNSF and SWA perform any study of side-by-side E-Sampler variability if all they have to work with are output voltages that cannot be linked to any of the “real” particulate or sampler characteristics that are the very source of the inter-sampler variability? The simple answer is that BNSF and SWA cannot account or accurately assign inter-sampler variability uniquely to any particular characteristics of the particulate or the samplers themselves because they choose not to perform the science required to do so.

- 4. BNSF and SWA, and more specifically, Mr. Sultana and Dr. Emmitt’s claim that a detailed review and study of the relevant technical literature would have done nothing to inform them of problems they would encounter by using E-Samplers to monitor coal particulates in the manner that they have constitutes a flagrant disregard of relevant findings from research performed over the past 40 years. If this body of work had been consulted early in their efforts they likely would have identified numerous problems in their monitoring techniques and methods.**
 - a. BNSF’s reply statement and the reply statements of Mr. Sultana and Dr. Emmitt repeatedly state that reviewing and studying the relevant technical literature and submitting the means and methods developed by SWA for peer review would have been wasted efforts because they would have done nothing to assist in finding a solution to the problems associated with monitoring fugitive coal emissions from

railcars. This approach shows a flagrant disregard of the relevant findings from previous researchers that if consulted earlier by Dr. Emmitt, SWA and BNSF could have greatly assisted them in identifying the problems that they in fact have encountered using the E-Samplers, especially since they have used the E-Samplers without reference to any other method (such as filters) that can establish whether the concentrations found are reasonably accurate or not. These problems include a complete lack of reference to any other measurement of particulate matter concentration to verify correct function, problems with E-Sampler accuracy associated with measuring coal particulates of varying size, shape and reflectance, and a complete lack of substantiation of SWA { } claims of linearity between the E-Sampler output signal and particulate matter concentration.

- b. BNSF states “While the shippers are quick to criticize the E-Samplers, they offer no alternatives to these devices, which are the best available dust-monitoring devices for field monitoring of dust levels.”³¹ This is a misrepresentation and again points to the need for BNSF and SWA to review and study the relevant technical literature because multiple alternative monitoring methods are available and are described in detail. Some of these alternative methods include Federal Reference Methods, such as high-volume filter samplers (gravimetric) or TEOM (tapered element oscillating microbalances) devices. In fact, a number of “real-world” dust monitoring field studies (see cited reference as an example) report that they use multiple types of monitoring devices to check the calibration and accuracy of the results given by monitoring devices that are not EPA-approved reference methods, such as the E-Samplers.³² In discussions that I had with one researcher at the US Department of Agriculture, this researcher mentioned that the USDA calibrates its nephelometers (i.e., light scattering devices such as E-Samplers) against EPA reference methods to have “comfort to know that the

³¹ “BNSF Railway Company’s Reply Evidence and Argument,” p. 21.

³² Sharratt, B., Feng, G., Wendling, L., *Loss of Soil and PM10 from Agricultural Fields Associated with High Winds on the Columbia Plateau*, Earth Surf. Process. Landforms, Vol. 32: 621-630, 2007.

devices are performing accurately.” This researcher also mentioned that when the USDA uses E-Samplers in field monitoring activities, they run them side-by-side with other devices that include EPA-approved monitors, again to ensure accuracy.

5. BNSF and SWA state that the IDV / IDV.2 concept and its calculation constitutes a “reasonable and practical”³³ approach to monitor relative dust levels from passing coal trains. This conclusion is not supported by the data presented by BNSF and SWA as part of this proceeding, and it cannot be evaluated independently because BNSF and SWA believe that the technical community has little or nothing to offer in peer review. Their continued refusal to release the “code” used to calculate IDV / IDV.2 prevents any other party from being able to review and test the meaningfulness of the concept and its corresponding calculation.

- a. BNSF states “BNSF / SWA have made available to the shippers the detailed logic and assumptions used to produce IDV.2 calculations. The shippers do not need to have access to SWA’s proprietary codes to understand the IDV.2 calculations.”³⁴ These statements are mischaracterizations of what BNSF and SWA have provided for review and further reinforce that SWA likely believes that its IDV calculation method would likely not hold up to scrutiny during peer review. The only document provided by BNSF or SWA that attempts to describe the method by which the IDV / IDV.2 is calculated {

}.³⁵ In addition, the {

³³ “Reply Verified Statement of Charles Sultana,” p. 3.

³⁴ “BNSF Railway Company’s Reply Evidence and Argument,” p. 27.

³⁵ “Reply Verified Statement of G. David Emmitt,” Exhibit 13 – {
}. Of course, the only way to know if this description is accurate is to review the program itself.

}.

Consider Dr. Emmitt's statement "The standard [i.e., the IDV / IDV.2 standard] is not complicated and the calculations used to produce an IDV.2 for a passing train are straightforward."³⁶ However, a quick analysis of {

³⁶ "Reply Verified Statement of G. David Emmitt," p. 21.

xviii. }

c. Even assuming that it is accurate, {

}³⁷ {

}.

³⁷ "Reply Verified Statement of Charles Sultana," p. 19.

- d. Finally, Dr. Emmitt states that the “WCTL/CCCS’ claim that the IDV.2 process is a ‘black box’ is also misleading.”³⁸ This is simply untrue, and the most basic, most direct evidence of this untruth is that Mr. Sultana himself in writing referred to the IDV / IDV.2 process as a “black box.” {

}³⁹

6. BNSF’s assertions that the E-Samplers at MP90.7 are collecting “covariate”⁴⁰ data of coal particulate deposited in the ballast at MP90.7 by passing trains is not supported by any scientific or engineering studies or other data that BNSF and/or SWA have provided.

- a. BNSF and SWA claim that the particulate matter measured by the E-Samplers at MP90.7 is a “strong covariate” measure of coal dust deposited on the ballast by passing trains at the E-Sampler locations. I addressed these claims in detail in my two prior verified statements and will not repeat this material in my rebuttal verified statement. Suffice it to say here that neither BNSF nor SWA have prepared and/or provided any meaningful studies or field data that support a direct link between the E-Sampler measurements (as questionable as they are) and corresponding actual coal particulate deposits in the ballast.
- b. As I have repeatedly stated in my prior statements, and repeat here, the only way to scientifically confirm (taking video images of dust clouds surrounding moving trains as BNSF and SWA have recently done is not scientific) what particulate matter the E-Samplers are collecting is to use the E-Samplers equipped with the gravimetric filters. In this manner the particulates supposedly measured by the

³⁸ “Reply Verified Statement of G. David Emmitt,” p. 21.

³⁹ {

}

⁴⁰ “Reply Verified Statement of G. David Emmitt,” p. 3.

sampler can then be analyzed to determine exactly what they are. Dr. Emmitt admits that he has used filters in the past for other studies ... but why not this one given that their analysis would directly answer this question? In addition, the only way to directly identify the amount of coal dust in the ballast at the E-Sampler locations is to actually sample and properly analyze the ballast at those locations. BNSF has presented no evidence that I have seen that shows that these basic scientific tests were performed.

VERIFICATION

I, Mark J. Viz, Ph.D., P.E., verify under penalty of perjury that I have read the foregoing Verified Statement and know the contents thereof; and that the same are true and correct. Further, I certify that I am qualified and authorized to file this statement.



Mark J. Viz

Executed on: June 2nd, 2010

**BEFORE THE
SURFACE TRANSPORTATION BOARD**

FINANCE DOCKET NO. 35305

**ARKANSAS ELECTRIC COOPERATIVE CORPORATION --
PETITION FOR DECLATORY ORDER**

Rebuttal
Verified Statement

Of

Dr. Gary M. Andrew
Senior Consultant
L.E. Peabody & Associates, Inc.

On behalf of

Western Coal Traffic League
And Concerned Captive Coal Shippers

Redacted, Public Version

Date: June 4, 2010

<u>TABLE OF CONTENTS</u>	<u>PAGE</u>
I. INTRODUCTION	1
II. SUMMARY AND FINDINGS	3
A. The Context of BNSF's Variability Analyses	3
B. Mr. Sultana's Reply Verified Statement and My Rebuttal Conclusions	6
III. BNSF'S USE OF LINEAR REGRESSION IS IMPROPER BECAUSE BOTH OF BNSF'S VARIABLES INCLUDE MEASUREMENT ERRORS	8
IV. BNSF'S USE OF LINEAR REGRESSION IS IMPROPER BECAUSE VARIANCE IN BNSF'S DATA SET INCREASES AS DUST LEVELS INCREASE	12
V. BNSF'S LINEAR REGRESSION IS FLAWED BECAUSE OF WEAKNESSES IN BNSF'S DATABASE	17
VI. BNSF'S SEARCH FOR CONSULTANTS	19

LIST OF EXHIBITS

__(GMA_6)¹

F-Test on BNSF Sample Data (for Homoskedasticity)

¹ Exhibit No __ (GMA-1) through Exhibit No __ (GMA-5) were included with my Opening Verified Statement in this proceeding filed on March 16, 2010.

I. INTRODUCTION

My name is Dr. Gary M. Andrew. I submitted a Verified Statement in this proceeding on March 16, 2010 on behalf of the Western Coal Traffic League and the Concerned Captive Coal Shippers (“Coal Shippers”). My qualifications are set forth in my earlier Verified Statement.

In my Opening Verified Statement I explained that there were defects in BNSF Railway Company’s (“BNSF”) use of statistical tools to manipulate the data that BNSF gathered using E-Sampler Track Side Monitors (“TSM”). Those errors precluded the use of that data as a basis for developing a reliable system of measuring coal dust from trains originating on the Orin Subdivision in Wyoming. In particular, my testimony demonstrated that the simple linear regression utilized by BNSF to determine an emissions cap of 300 units on BNSF’s Integrated Dust Value (“IDV”) scale was inappropriate for several independent reasons.

I have been requested by Western Coal Traffic League and the Concerned Captive Coal Shippers (collectively, “Coal Shippers”) to review and analyze the statistical aspects of the Reply Verified Statement (“RVS”) submitted by BNSF’s Mr. Charles Sultana in this proceeding. In his RVS, Mr. Sultana rejects my criticisms of his statistical analysis, and instead claims that I am “...confusing two basic issues: (1) the accuracy of the [E-Sampler] equipment itself, and (2) the variability of readings by accurate equipment due to environmental factors that cannot be controlled in measuring coal dust.”² In addition, Mr. Sultana contends that my criticisms of BNSF’s regression analysis are “misplaced”.³

Significantly, enforcement of BNSF’s IDV-based emissions standard would result in additional millions of dollars being paid by shippers of Powder River Basin coal. However, the

² RVS of Sultana, page 4.

³ RVS of Sultana, page 8.

statistical procedures followed by BNSF to develop that standard are based upon improper application of statistical tools with insufficient usable data.

My Rebuttal Verified Statement responds to the issues raised by Mr. Sultana under the following topical headings:

- II. Summary and Findings
- III. BNSF's Use of Linear Regression is Improper Because Both of BNSF's Variables Include Measurement Errors
- IV. BNSF's Use of Linear Regression is Improper Because Variance in BNSF's Data Set Increases As Dust Levels Increase
- V. BNSF's Linear Regression is Flawed Because of the Weaknesses in BNSF's Database
- VI. BNSF's Search for Consultants

II. SUMMARY AND FINDINGS

A. The Context of BNSF's Variability Analyses

At the outset of this rebuttal statement, it is important to review the context of BNSF's side-by-side E-Sampler variability studies. Notably, BNSF engaged in its side-by-side testing of E-Sampler monitors because of {

}⁴

BNSF understood that in order to advance the TSM's as a basis for the enforcement of a coal dust emissions standard, {

}.⁵ BNSF and Simpson Weather Associates, Inc.'s ("SWA") efforts to demonstrate that their TSM's produced sufficiently reliable results {

{

} and SWA recommended that BNSF implement a field testing procedure that would periodically check two monitors against each other. {

} As acknowledged by Mr. Sultana, BNSF

⁴ {

⁵ {

}

}

declined to follow this recommendation, noting that “BNSF never implemented the field validation methods proposed by SWA.”⁶

BNSF instead implemented a very brief period of side-by-side testing in the Summer of 2007. That testing included side-by-side tests using pairs of TSM devices at milepost 90.7 {

} and side-by-side tests of pairs of TSM devices conducted by SWA in a laboratory setting. That testing ultimately became the source of the 436 data pairs that Mr. Sultana and I have disputed in our prior statements in this case.

Significantly, when BNSF’s Mr. Sultana obtained the data from the side-by-side tests, {

}⁷ One of Mr. Sultana’s presentations noted that {

}⁸ Stated differently, {

⁶ RVS of Sultana, page 7

⁷ {

}

⁸ See BNSF_Coaldust_0037184.

}⁹

{

}¹⁰

{

}

Following that dubious principle, BNSF took the 436 pairs of side-by-side data (from its laboratory and field data) and performed a linear regression to develop prediction intervals around the 134 IDV figure that BNSF had calculated from its arbitrary goal of reducing coal dust emissions (as observed using the E-Samplers) by 85%. In layman's terms, BNSF took the 436 pairs of data and plotted them against each other on an X and Y axis. If a pair of observations for a given train yielded a 200 IDV result using the first monitor and a 100 IDV result using the second, then BNSF plotted this point at X = 200 and Y = 100. BNSF plotted a point on its chart for each of the 436 data pairs. BNSF then identified the line that most closely represented the relationship between the results of the pairs of side-by-side monitors, and then BNSF used statistical tools to estimate how closely this ideal line actually matched the results from BNSF's

⁹ {

¹⁰ See BNSF_Coaldust_0037371 to 0037372.

}

testing. Stated simply, BNSF evaluated how close the 436 points were to the line that BNSF had drawn. Based on the average distance of the plotted points from the ideal regression line, BNSF concluded that only an IDV reading over 300 would give BNSF a 95% confidence that the “actual” IDV value of the train passing MP 90.7 was over 134.

Critically, however, it was improper for BNSF to use its new statistical tool (*i.e.*, linear regression) under the circumstances that BNSF faced. As I describe below, there are a number of serious problems with BNSF’s use of linear regression.

B. Mr. Sultana’s Reply Verified Statement and My Rebuttal Conclusions

Mr. Sultana continues to support the BNSF analysis and does not believe that any of the criticisms raised are valid or that any flaws exist in BNSF’s approach. As shown below, it is Mr. Sultana’s criticism that is “misplaced” and the BNSF continues to rely upon unverifiable data and a regression approach that does not demonstrate that the dust value for trains will be accurate.

Based on my review of Mr. Sultana’s criticisms of my prior testimony, my conclusions are as follows:

1. BNSF’s use of linear regression to attempt to draw conclusions regarding the results of its side-by-side E-Sampler observations renders those conclusions improper and unreliable because both observations (*i.e.*, the X and Y values in BNSF’s data plot) include measurement error. The existence of measurement error in both the independent and dependent variables violates a fundamental requirement for the use of simple linear regression.
2. BNSF’s use of linear regression is inappropriate for the additional reason that BNSF’s data violates a second fundamental requirement for using simple linear regression; namely, BNSF’s data shows non-constant variance over the range of observed dust values.
3. BNSF’s simple linear regression to develop its IDV standard also is flawed because of limitations and deficiencies in the underlying data set. BNSF relied extensively on laboratory data (which does not represent the conditions

faced by actual coal trains) and on field “data” {
}

4. {

}

The details supporting my conclusions are discussed in the remainder of this Rebuttal
Verified Statement.

III. BNSF'S USE OF LINEAR REGRESSION IS IMPROPER BECAUSE BOTH OF BNSF'S VARIABLES INCLUDE MEASUREMENT ERRORS

BNSF's use of linear regression is inappropriate because it violates the fundamental statistical principle that linear regression cannot be relied upon where both the independent and the dependent variables being compared include measurement errors. Mr. Sultana is critical of the concerns I raised in my Opening Verified Statement in this regard.¹¹

Mr. Sultana responds to my opening statement in two different, and largely conflicting, ways. First, he argues that the error term built into the basic regression equation can include measurement error, and he observes that "nearly all measurements have some error, either between devices or operators."¹² This simple observation does not override the fundamental problem that occurs when measurement errors occur in BOTH the dependent variable Y and the independent variable X. If there is measurement error in Y only, the error term in the linear regression model absorbs the error and the effect is simply to increase the variance of the error term. However, if both X and Y contain measurement errors, any attempt to model that error will result in an additional error term that cannot occur in simple linear regression. Ignoring the error in measurement of the independent variable X will result in biased estimation of the parameters—such as slope, intercept, confidence intervals—that linear regression is designed to produce. In cases where the measurement errors are large as is the case in the BNSF monitoring

¹¹ RVS of Sultana, page 10. At page 10 of my Opening Verified Statement I stated that there cannot be measurement errors in either the dependent ("Y") or independent ("X") variable of a regression. Mr. Sultana is correct that the simple linear regression contains an error term and therefore the dependent variable can contain error. However, in BNSF's data both the independent and dependent (or both X and Y) variables contain error, which violates an assumption required for use of simple linear regression.

¹² RVS of Sultana, page 10.

system, these estimates are not reliable.¹³

Next, Mr. Sultana attempts to attack my statement from the opposite perspective, arguing that his E-Sampler devices are free from concerns about measurement error because: (i) they do not have blatant mechanical problems such loose light-reading diodes, etc.; (ii) the TSM devices “...self calibrate twice per day...”;¹⁴ and (iii) the monitors are returned to the manufacturer “...every two months for calibration, cleaning and manual maintenance.”¹⁵ Thus, according to Mr. Sultana, the data gathered from the TSM can be utilized to “...determine the relationship between two variables...”¹⁶ and no reference monitor is needed to verify the accuracy of the output data for the TSM. Mr. Sultana’s arguments are inapposite from a statistical perspective.

Mr. Sultana has chosen to develop a dust standard based on the regression of the outputs of two data readings from side-by-side TSM devices. For each observation, he utilizes one monitor as the independent variable and one monitor as the dependent variable. This is not appropriate if both data points in the observation contain measurement error, as occurs with the TSM data and is admitted by BNSF. Mr. Sultana attempts to deflect this problem by stating that “...the error term built into the basic regression equation can include measurement error.”¹⁷ This is true but ignores the fact that the TSM data relied upon by Mr. Sultana contains measurement errors in both variables.

¹³ See footnotes 8 and 9 on page 9 of my Opening Verified Statement or see, e.g., Green, William H., *Econometric Analysis* (5th ed.), Prentice Hall, New Jersey (2003), page. 86. Also, Hald, A. , *Statistical Theory with Engineering Applications*, John Wiley, New York (1962) p. 615 shows a solution provided “...the ‘true’ value of the property and the error of measurement, are stochastically independent.” The fact that the standard deviation of the error in measurement is a function of the property (particulate concentration) violates this provision. More recent references show newer approaches but all require large sample sizes AND constant variance of measurement error that do not exist in the BNSF measurements.

¹⁴ RVS of Sultana, page 4.

¹⁵ RVS of Sultana, page 5.

¹⁶ RVS of Sultana, page 10.

¹⁷ RVS of Sultana, page 10. In my Opening Verified Statement, the simple linear regression equation shown at page 10 acknowledged the error term (e). The equation I showed was: $Y = a \cdot X + b + e$.

Both Mr. Sultana and another BNSF witness, Dr. Emmitt, clearly describe the existence of error in the TSM's ability to accurately measure the level of coal dust from a passing coal train. Dr. Emmitt described the process for developing the TSM recorded values as follows:

“...the E-Samplers [TSM] measure dustiness by reading the light scatter from a sample of dust. The light scatter from a particular sample of dust depends on the size, shape and distribution of dust particles in the sample. But any give sample will have varying particles and particle distribution, making it unlikely that two readings of the same air sample will produce exactly the same dust levels. This is not a problem with the design or operation of E-Samplers, but is a result of environmental factors within the air sample that cannot be controlled.”¹⁸
(emphasis added)

Mr. Sultana recognizes the same problem, stating:

“If it were possible to measure the same dust sample twice by the same E-Sampler, there is a chance that the E-Sampler (even if it were perfectly calibrated) would produce two different readings. ... Since dust particles are not distributed evenly in a sample of air, two different dust readings from a calibrated monitor of the same air sample may produce two different dust level readings.”¹⁹

Furthermore, Mr. Sultana recognized the existence of the errors in measurement when he developed the measurement of the standard error in his analysis on pages 14-15 of his RVS.

In other words, even given a consistent level of dust, the dust monitors will not record the same value. The question then becomes, which reading (if either) is correct?

Thus, both Mr. Sultana and Dr. Emmitt have recognized that there are factors that cannot be controlled in measuring dust by the TSM, i.e., the “measurement error”. The following demonstrates the issue with the measurement errors in two side-by-side monitors, M1 and M2, that recorded the data utilized by BSNF. In the side by side testing, there is a true IDV for a given train (call this value T). Monitor 1 measures this train as:

¹⁸ RVS of Emmitt, page 18.

¹⁹ RVS of Sultana, page 5.

$$M1 = T + e1$$

Monitor 2 measures this train as:

$$M2 = T + e2$$

In these two equations, the terms e1 and e2 represent the errors introduced by the “environmental factors” even if the dust monitors are in perfect calibration and are maintained properly. Both measurements contain error.

In the regression analysis performed by Mr. Sultana to develop his IDV threshold of 300, Mr. Sultana regressed the M1 value against the M2 value (or vice versa). As shown above, there are errors in measurements of both variables in Mr. Sultana’s linear regression model that he used to compute the critical value of an IDV of 300.

At pages 11-12 of my Opening Verified Statement, I identified the statistical literature that explained why there are no known methods for solving the problem in simple linear regression when BOTH the independent and dependent variables have significant “measurement error”. Mr. Sultana does not dispute the findings in this literature; instead, he maintains that the errors do not exist. Significantly, however, Mr. Sultana’s reply verified statement also discusses the standard deviation of the error in his variables. Mr. Sultana cannot have it both ways. By his own admission, uncontrollable environmental factors introduce uncertainty and error into the observations from each of his side-by-side E-Sampler monitors. For the reasons described above and supported by credible references in my Opening Verified Statement, linear regression will not produce reliable estimates of confidence intervals when – under circumstances such as these – more than one variable contains measurement errors.

IV. BNSF'S USE OF LINEAR REGRESSION IS IMPROPER BECAUSE VARIANCE IN BNSF'S DATA SET INCREASES AS DUST LEVELS INCREASE

In my opening statement, I explained that the second principal defect in BNSF's use of linear regression to establish the IDV standard was that the variance in BNSF's data set (*i.e.*, the side-by-side TSM observations) was not constant over the range of observed values. I explained that this type of defect precludes reliance on linear regression. In his reply statement, Mr. Sultana agrees with my statement of this general statistical principal where he states "Dr. Andrew's assertion that variability should be relatively constant across the data set is correct..."²⁰ Consequently, he and I agree that if variability is not constant across the data set that BNSF relied upon to create its 300 IDV standard (using linear regression), then that standard must be rejected as unreliable.

Mr. Sultana disagrees with my argument, however, insofar as he claims that I have not demonstrated that the variability is non-constant. Specifically, Mr. Sultana begins his critique of my observation by referring to my analysis as "...a statistically invalid 'eyeball' approach, which is set out in his exhibit GMA_5."²¹ Mr. Sultana may be correct that my prior testimony used my "eyeball" approach (with 50 years of training and experience behind it) to reach the conclusion that the differences in the dust data increase as the IDV increases. However, the quantitative analysis summarized on the graph in Exhibit__ (GMA-5) strongly supports my conclusion. If the differences, or variance, between Mr. Sultana's regression results and the observed data were constant over the range of all IDV levels, the cumulative standard deviation in the graph in Exhibit__ (GMA-5) should be a nearly horizontal line as opposed to a line with increasing values.

²⁰ RVS of Sultana, page 10.

²¹ RVS of Sultana, page 11. Mr. Sultana correctly notes at page 12, that Exhibit__ (GMA-5) is the cumulative standard deviation in the TSM data, not the standard error. Mr. Sultana also notes at page 14 that the standard error equals the standard error divided by the square root of the number of values. The graph of the cumulative standard error and the graph of the cumulative standard deviation would look identical, except for a scale change.

Based on my analysis of the data relied upon by Mr. Sultana, I was able to determine that there was heteroskedasticity (non-constant variance) in the data. This is true because the variation increased so dramatically as the value of the data from increasing dust levels. Using the equation terms discussed in the prior section of this Rebuttal Verified Statement, the statistic I used to compute Exhibit_(GMA-5) was based upon the difference between the two monitor readings:

$$M1 - M2 = T + e1 - (T - e2) = e1 - e2$$

Mr. Sultana restates Exhibit_(GMA-5) in the graph on page 15 of his RVS. Mr. Sultana's graph reflects a scatter diagram of the standard error for each individual point and not the cumulative amounts as shown in Exhibit__(GMA-5). Based on his presentation of the data, Mr. Sultana attempts to demonstrate that the differences, or variances, are not increasing as the IDV levels increase. However, this scatter diagram does not, and cannot, address the issue I raised.

In order to demonstrate that BNSF's data set reflects non-constant variability and to resolve the dispute regarding our competing prior analyses, I have performed an additional test of the data set for this rebuttal statement. In particular, to confirm my judgment regarding the heteroskedasticity (non-constant variance) in the data relied upon by Mr. Sultana, I have calculated what is well-known in statistical terminology as an "F ratio" as a means of demonstrating that the variance in BNSF's data set is not constant. In performing this test, I have used Mr. Sultana's method of treating each observed data pair as estimating a measure of variation; however I will estimate the variance in the data set, rather than estimating the standard

deviation. By way of background, the reason for using the variance is that the F-ratio test that I will use is based upon the ratio of variances.

The 436 estimates of variance in the BNSF data set can be split into two groups, one group with low dust values and the other with high dust values. The estimates of variance in each group are combined by a simple weighting procedure.²² This yields an unbiased estimate of the variance of the readings with lower dust values and an unbiased estimate of the variance of the readings with higher dust values. The ratio of these two estimates (the “F-ratio”) has what is known as a “Snedecor F” distribution that can then be used to test for homoskedasticity (constant variance) between the two data sets. Significantly, if the value of the “F-ratio” is larger than the applicable critical value (determined on the basis of the degrees of freedom and the level of confidence specified), then there is a high probability (here I chose 99%) that the system is heteroskedastic, i.e., that the variance is not constant between the two data sets. As shown below, an analysis of the F-Ratio for the BNSF sample data shows that the variance is not constant for: 1) the entire sample data; 2) the laboratory data; 3) the field data; or, 4) the field data that excludes the non-zero readings. In other words, this test demonstrates that BNSF’s data set fails to meet the standard that Mr. Sultana and I agree is an essential prerequisite for the legitimate use of linear regression.

In order to prepare my analysis of the F-Ratio, I separated each BNSF data set into two groups. The first group of data reflects all observations where the maximum IDV reading equaled a value of 134 or greater. The second group of data reflects all observations where the maximum IDV reading equaled a value less than 134.²³

²² Burington and May, *Handbook of Probability and Statistics with Tables*, p.146, Equation 13.38.2.

²³ The breakpoint value of 134 was chosen because this is the value that Mr. Sultana relied upon in setting his maximum standard of an IDV of 300.

The results of my analysis of the variance in the dust sample data gathered by BNSF are shown in Exhibit__ (GMA-6).²⁴ The number of observations in each of the four sets of data is summarized on Line 1 of Table 1 below. For each of my analyses, I first calculated the aggregate variance for the BNSF sample data where the maximum IDV was greater than 134 (Line 2a of Table 1 below). Next, I calculated the aggregate variance for the BNSF sample data where the maximum IDV was less than 134 (Line 3a of Table 1 below). The F-Ratio, shown on Line 3 of Table 1 below, is the ratio of: (i) the variance for the sample data where the IDV is greater than 134; to (ii) the variance for the sample data where the IDV is less than 134; i.e., line 2a divided by line 2b in Table 1 below. Line 4 of Table 1 below summarized the expected F-Ratio, based on the F-distribution and degrees of freedom, for each of my analyses. In order for Mr. Sultana's position to be correct, the values on line 3 must be less than the values on line 4. However, for each of the four sets of data analyzed, the F-Ratios were many times greater than necessary for concluding that the variance is non-constant and thus improper. In BNSF's data set, the variance (and the square root of variance, known as the standard deviation) increase as the dust level increases. Therefore, my F-Ratio test demonstrates that the BNSF data set violates another of the requirements for using simple linear regression to determine the critical value where a train will be declared out of tolerance; the requirement of homoskedasticity.²⁵

²⁴ Exhibit No__ (GMA-1) through Exhibit No__ (GMA-5) were included with my Opening Verified Statement in this proceeding filed on March 16, 2010.

²⁵ The Goldfeld and Quandt Test for Heteroskedasticity was also used and gave even larger indications of non-constant variance. (see Maddala, p204ff. and my workpapers.)

{

}

The consequences of heteroskedasticity include:

- a. "The estimates of the variances are also biased, thus invalidating the tests of significance";
- b. "...the expected value of the estimated variance is smaller than the true variance"; and,
- c. "...getting shorter confidence intervals than the true ones." ²⁶

²⁶ Maddala, G. S., *Introduction to Econometrics* (3ed), John Wiley & Sons, Ltd, New York, (2002) pp 207-9

V. BNSF'S LINEAR REGRESSION IS FLAWED BECAUSE OF THE WEAKNESSES IN BNSF'S DATABASE

BNSF's linear regression suffers from additional defects regarding the underlying data set used for the regression. BNSF claims to have used "over 400" observations when computing the critical value;²⁷ however the breakdown of "all data" (436 pairs of TSM readings) into subsets shows a serious weakness in this database. {

}. The data from the laboratory tests is not representative of what will happen in practice at MP 90.7.

Notably, Mr. Sultana himself agrees with this data rejection principle and argues dismissively in his reply statement that SWA laboratory data that does not relate to actual coal dust observations from actual trains should be excluded from consideration in this proceeding. Mr. Sultana states that "The [SWA laboratory data from the SWA's field validation proposal] and analysis set out in Dr. Andrew's Exhibits . . . do not merit a detailed response [I]t is obvious from the [SWA laboratory data] used in Dr. Andrew's exhibits that the data do not correspond to the coal dust data BNSF is using in monitoring coal trains. Not a single data point on GMA_2 [drawn from SWA's own testing] is anywhere near the 300 IDV.2 threshold that BNSF set. The extraordinarily high values in GMA_2 obviously correspond to something other than coal dust moving from coal trains."²⁸ In preparing his reply statement, Mr. Sultana may have overlooked the fact that my exhibit GMA_2 merely set forth SWA's own side-by-side E-Sampler test data, but the observation is nonetheless valid. This type of data "obvious[ly]" does

²⁷ RVS of Sultana, page 6.

²⁸ RVS of Sultana, page 8.

not correspond to coal dust data for actual coal trains, and should not be included in the data set that Mr. Sultana used to calculate his 300 IDV standard.

The field data included in Mr. Sultana's critical data set is likewise flawed. {

}

In summary, BNSF has not produced regression results that are reliable. First, the data from both data points for each observation contain measurement errors, invalidating the results of a simple linear regression. Second, the data exhibits greater variance at higher IDV levels which questions the validity of the regression results. Third, the BNSF regression analysis combines both laboratory and field observations as well as questionable data points {

}. Contrary to BNSF's assertions, the regression is not a statistically valid analysis based on extensive data, but rather an inappropriate attempt to force limited and unreliable data into an answer that fit BNSF's needs.

VI. BNSF'S SEARCH FOR CONSULTANTS

At pages 13-14 of my Opening Verified Statement, {

}²⁹

{

²⁹ RVS of Sultana, page 18.

}

VERIFICATION

STATE OF COLORADO

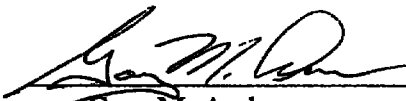
)

CITY OF LOUISVILLE

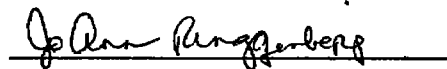
)

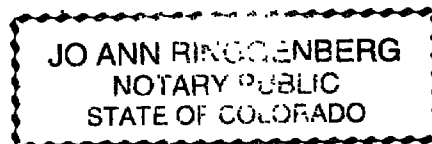
)

I, Dr. Gary M. Andrew, verify under penalty of perjury that I have read the foregoing Verified Statement of Gary M. Andrew, that I know the contents thereof, and that the same are true and correct. Further, I certify that I am qualified and authorized to file this statement.


Gary M. Andrew

Sworn to and subscribed
before me this 2nd day of June, 2010





My Commission Expires 11/04/2012

My Commission Expires: 11-4-2012

Registration Number:

**F-Test on BNSF Sample Data
(for Homoskedasticity)**

**BEFORE THE
SURFACE TRANSPORTATION BOARD**

FINANCE DOCKET NO. 35305

**ARKANSAS ELECTRIC COOPERATIVE CORPORATION --
PETITION FOR DECLATORY ORDER**

Rebuttal
Verified Statement

Of

Thomas D. Crowley
President
L.E. Peabody & Associates, Inc.

On behalf of

Western Coal Traffic League
And Concerned Captive Coal Shippers

Redacted, Public Version

Date: June 4, 2010

<u>TABLE OF CONTENTS</u>	<u>PAGE</u>
I. INTRODUCTION.....	1
II. SUMMARY AND FINDINGS	3
III. AMOUNT OF COAL DUST IN BALLAST.....	6
IV. BNSF’S DEFERRED MAINTENANCE.....	7
V. INCREMENTAL COST DUE TO COAL DUST	9
A. BNSF RESTATED ANALYSIS OF MAINTENANCE COSTS.....	9
B. UP’S UNQUANTIFIED MAINTENANCE COSTS.....	12
VI. COST TO APPLY SURFACTANTS	14
VII. UP’S ASSERTIONS REGARDING THE BNSF TARIFF	18
VIII. UP’S ASSERTIONS REGARDING COAL RATES.....	20

LIST OF EXHIBITS

<u>EXHIBIT NO.</u> (1)	<u>EXHIBIT DESCRIPTION</u> (2)
__(TDC-5) ¹	Letter from Andrew B. Kolesar, Esquire to Anthony J. LaRocca, Esquire, dated May 7, 2010
__(TDC-6)	Letter from. Andrew B. Kolesar, Esquire to Joe Rebein, Esquire, dated May 7, 2010
__(TDC-7)	Letter from Anthony J. LaRocca, Esquire to Andrew B. Kolesar, Esquire, dated May 20, 2010
__(TDC-8)	Letter from Anthony J. LaRocca, Esquire to Frank Pergolizzi, Esquire, dated February 26, 2010

¹ Exhibit No__(TDC-1) through Exhibit No__(TDC-3) were included with my Opening Verified Statement in this proceeding filed on March 16, 2010. Exhibit No.__(TDC-4) was included in my Reply Verified Statement in this proceeding filed on April 30, 2010.

I. INTRODUCTION

My name is Thomas D. Crowley. I submitted an Opening Verified Statement in this proceeding on March 16, 2010 and a Reply Verified Statement on April 30, 2010. These verified statements were submitted on behalf of the Western Coal Traffic League and the Concerned Captive Coal Shippers ("Coal Shippers"). My qualifications are set forth in my Opening Verified Statement.

The BNSF Railway Company ("BNSF") and Union Pacific Railroad Company ("UP") submitted their Reply Evidence on April 30, 2010. BNSF and UP continue to overstate the magnitude of the maintenance problems related to coal dust and to understate the cost to coal shippers to apply surfactants to prevent coal dusting.

I have been requested by Coal Shippers to review and analyze the Reply Verified Statements ("RVS") submitted by BNSF's Mr. William VanHook, UP's Mr. Douglas Glass and UP's Mr. Dexter N. McCulloch. Specifically, I have been asked by Coal Shippers to address Mr. VanHook's statements related to the following three topics:

- 1) The amount of coal dust in the ballast²;
- 2) The existence of deferred maintenance on BNSF's Orin Subdivision prior to the 2005 derailments³; and
- 3) The cost of incremental maintenance related to coal dust compared to the cost to apply surfactants to the coal in the rail cars.⁴

Regarding the RVS of UP's Mr. Glass and Mr. McCulloch, I have been asked by Coal Shippers to address their statements related to:

- 1) The impact of BNSF's proposed tariff rules on UP's coal customers⁵;

² RVS of VanHook, pages 5-7.

³ RVS of VanHook, pages 22-23.

⁴ RVS of VanHook, pages 24-32.

- 2) The cost-benefit analysis that compares the incremental maintenance costs versus the benefits related to the application of surfactants to the coal in the rail cars⁶;
- 3) The claim that Coal Shippers “downplayed the harmful aspects of coal dust”;⁷ and
- 4) The level of costs and profitability in UP’s coal rates.⁸

My rebuttal testimony is organized below under the following topical headings:

- II. Summary and Findings
- III. Amount of Coal Dust in Ballast
- IV. BNSF’s Deferred Maintenance
- V. Incremental Cost Due to Coal Dust
- VI. Cost to Apply Surfactants
- VII. UP’s Assertions Regarding the BNSF Tariff
- VIII. UP’s Assertions Regarding Coal Rates

⁵ RVS of Glass, page 4.

⁶ RVS of Glass, pages 4-7.

⁷ RVS of McCulloch, page 1.

⁸ RVS of Glass, pages 8-10

II. SUMMARY AND FINDINGS

In their Reply Evidence, BNSF and UP continue to claim that coal dust in the ballast is a significant cause of increased maintenance costs. In response to the analyses I presented in my Opening Verified Statement, BNSF and UP claim that I have understated the incremental maintenance costs related to coal dust and overstated the costs to apply surfactant to coal in rail cars. Also, BNSF maintains that it has not experienced deferred maintenance on the Orin Subdivision. Further, UP has challenged any contention that current coal rates provide for sufficient revenue to cover maintenance costs. It asserts that coal rates do not pay all of the required costs because UP has been found to be revenue inadequate.

After a review of BNSF's and UP's Reply Evidence, I conclude that BNSF and UP currently receive more than sufficient revenues from Powder River Basin ("PRB") coal shippers to maintain the rail lines in the PRB, even at the maintenance levels suggested by BNSF's witnesses in this proceeding. I find no basis to conclude that the expected costs to shippers to cover the costs of surfactants will be any different than I showed in my Opening Verified Statement. Accepting some of BNSF's adjustments to my analysis of incremental ballast maintenance associated with coal dust, I still conclude that the costs of spraying PRB coal trains is substantially greater than the costs for dealing with coal dust through traditional maintenance techniques, based on available evidence as to the amounts of such costs. In addition, UP's claims that coal rates are insufficient to pay for maintenance costs or to contribute to UP's revenue adequacy are without any merit.

My specific observations and conclusions, as discussed in more detail in the remaining sections of this Rebuttal Verified Statement, are as follows:

1. BNSF asserts that the major contaminant to ballast on the coal lines is coal dust and that even small amounts of coal dust can cause significant damage. BNSF has not analyzed the amount of, or impact on maintenance cycles of, recognized ballast contaminants other than coal dust. It assumes, but has not demonstrated, that coal dust is solely responsible for increased ballast maintenance on the Joint Line and adjacent PRB lines;
2. BNSF asserts that no deferred maintenance has occurred on the Joint Line and that increased maintenance expenditures after the 2005 derailments were simply due to the belated realization that additional maintenance was required. First, BNSF recognizes that it failed to perform the required level of maintenance prior to the derailments, although it now claims it was unaware that additional maintenance was needed. Second, {

}

3. BNSF has restated the annual maintenance costs it claims are due to coal dust.
{

} For the “coal loop” and adjacent segments, I have not restated the annual maintenance costs, but have continued to rely on the {

} because BNSF’s analysis is based on flawed and unsupported assumptions regarding how maintenance is impacted as the trains move farther away from the coal mines;

4. UP asserts that my analysis of the cost of maintenance due to coal dust is flawed because I failed to include UP’s non-PRB line segments and failed to include the benefits to non-coal traffic. Although UP should have the data to support its claims, to the extent they have validity, UP did not present any analysis to support its claim (other than the statement that coal dust is fouling tracks far away from the coal mines). Because UP has chosen not to provide any data that would allow me, or this Board, to evaluate the extent of its coal-related maintenance costs, I have made no adjustments to my cost calculations for such claimed costs.

5. BNSF and UP claim that the cost to apply surfactants would {

}

6. BNSF states that the cost to spray equals less than { } and the benefit to shippers from the retention of additional coal due to the surfactants will add { } in value to the shippers. The cost to spray is also less than { }

}

7. Although UP asserts that the proposed BNSF tariff rules regarding coal dust would not impact UP coal shippers, UP has supported the BNSF in this proceeding by adopting BNSF's philosophy regarding the incremental costs due to coal dust and has sent letters to shippers supporting the use of a surfactant to meet BNSF's operating rules; and

8. {

} UP has no support or basis to claim that coal is not paying for all of its costs due to the fact that UP has been found to be revenue inadequate by the STB.

The details supporting my conclusions are discussed in the remainder of this Rebuttal Verified Statement and in my two earlier verified statements.

III. AMOUNT OF COAL DUST IN BALLAST

Mr. VanHook, at pages 5 through 7 of his RVS, criticizes the portion of my Opening Verified Statement where I point out that ballast becomes fouled because of other types of contaminants as well as coal dust. Mr. VanHook mischaracterizes my testimony as suggesting that “coal dust fouling is insignificant”.⁹ The purpose of my testimony was to show that BNSF had demonstrated neither the amount of other contaminants in the ballast on its PRB lines, nor the extent to which other contaminants might dictate the pace of ballast undercutting and other ballast cleaning notwithstanding reductions in coal dust. In my Opening Verified Statement, the point I made was that:

{

}¹⁰

Indeed, Mr. VanHook recognizes the validity of this point. Later in his testimony he states that: “To assess the impact of coal dust in ballast, it is also important to know what other contaminants are present and the amount of other contaminants”.¹¹ I agree, but it remains the case that BNSF has not presented this information which is important “[t]o assess the impact of coal dust in ballast”. Nor has BNSF demonstrated the changes to the maintenance cycles that are solely related to coal dust.

⁹ RVS of VanHook, page 5. UP’s Mr. McCulloch also mischaracterizes my testimony regarding the harmful aspects of coal dust. Like BNSF, UP has also not demonstrated the changes to the maintenance costs that are solely related to coal dust.

¹⁰ See my Opening Verified Statement, pages 8-9.

¹¹ RVS of VanHook, page 11.

IV. BNSF'S DEFERRED MAINTENANCE

Mr. VanHook denies that, prior to 2005, the Joint Line experienced deferred maintenance. Mr. VanHook states that the "...fact that BNSF performed greater maintenance after the [2005] derailments is not at all surprising, and it is not indicative of deferred maintenance."¹² The increase in maintenance, in Mr. VanHook's opinion, is due to "...BNSF's realization that additional maintenance needed to be carried out to address the adverse effects coal dust has on the ballast and track structure as a whole..." and that the "...magnitude of the [maintenance] problem is much larger than BNSF initially believed."¹³ Mr. VanHook's response to the issue of deferred maintenance are self-serving and ignore the positions of BNSF and UP at the time of the 2005 derailments.

First, to claim that deferred maintenance did not exist because of the need for "additional maintenance" or because the "problem is much larger" than believed demonstrates that maintenance was inadequate. Essentially, Mr. VanHook's position is that BNSF did not defer maintenance because BNSF did not know at the time that additional maintenance was required. As Coal Shippers' Mr. McDonald has explained, BNSF had all the knowledge it needed to recognize that its maintenance activities were inadequate.¹⁴ The BNSF should have known the situation, even if its claims that it did not were correct. BNSF's own documents, however, confirm that BNSF was not performing even its planned level of ballast maintenance activity.

Second, as noted at pages 15 through 16 of my Opening Verified Statement and in Appendix B to Coal Shippers Argument in the Opening Evidence, {

¹² RVS of VanHook, page 23.

¹³ RVS of VanHook, page 23.

¹⁴ Rebuttal Verified Statement of Mr. McDonald, pages 8-12.

}

1. {

}¹⁵

2. {

}¹⁶

3. {

}¹⁷

Other documents that Mr. VanHook relies upon as workpapers for his RVS also confirm that maintenance was deferred in the years leading up to the 2005 derailments. {

}¹⁸ {

}¹⁹ {

}²⁰

In summary, Mr. VanHook's statements and the documents demonstrate that insufficient maintenance occurred on the Joint Line in periods prior to the derailments.

¹⁵ See BNSF_Coaldust_0025220.

¹⁶ See UP-AECCBN-0006774.

¹⁷ See BNSF_Coaldust_0018132.

¹⁸ See BNSF_Coaldust_0076051.

¹⁹ See BNSF_Coaldust_0076053.

²⁰ See BNSF_Coaldust_0076055 and Exhibit_(TDC-7).

V. INCREMENTAL COST DUE TO COAL DUST

In my Opening Verified Statement, I demonstrated that, {

} BNSF and UP disagree with my analysis and my

response is summarized below.

A. BNSF RESTATED ANALYSIS OF MAINTENANCE COSTS

BNSF's Mr. VanHook made several adjustments to my analysis of the Orin Subdivision. Mr. VanHook's first adjustment "...was to update the unit costs to use current cost assumptions and to update the miles to reflect track miles added in recent construction projects."²¹ The second adjustment made by Mr. VanHook was to add back in the slow orders and track maintenance "costs" that were excluded from my analysis, even though BNSF has admitted that these are "...opportunity costs associated with longer cycle times..." and not actual expenditures for maintenance.²² At this point, Mr. VanHook calculates the annual incremental maintenance costs associated with coal dust at { }

Next, Mr. VanHook expanded his analysis to include the line segments that are the principal lines utilized by BNSF to move coal from the PRB mines, i.e., the "coal loop". {

²¹ RVS of VanHook, page 26. As part of his adjustment, Mr. VanHook did exclude the { } in initial right-of-way clean-up that was also excluded in my analysis (RVS of VanHook, page 27).

²² BNSF Reply Argument, page 18.

has “found that the levels of coal dust maintenance on BNSF’s subdivisions in the coal loop are not significantly different from those on the Orin Subdivision.”²³ Based on this unsupported assumption, Mr. VanHook calculates that the incremental annual maintenance costs for the coal loop (including the Orin Subdivision) equals { }

Mr. VanHook further expands his analysis to include the “four adjacent subdivisions that are directly affected by coal dust maintenance costs – the Angora, Big Horn, Ravenna, and Sandhills Subdivisions.”²⁴ For the Sandhills Subdivision, Mr. VanHook relies on the same assumptions as he utilized for his coal loop analysis. For the Angora, Big Horn and Ravenna Subdivisions, Mr. VanHook “account[s] for the lower level of incremental maintenance on these lines, [using] only fifty percent of the actual track miles, turnouts and concrete ties...”²⁵ Based on these assumptions, Mr. VanHook concludes that the total annual incremental maintenance costs for the coal loop and adjacent subdivisions equals { }

While there is some merit to the updating of the unit costs and service units for the Orin Subdivision and coal loop segments, Mr. VanHook's analysis is a transparent attempt to inflate the costs associated with coal dust maintenance.

Looking first at the Orin Subdivision costs, BNSF recognizes that the costs for track availability {

} I did not, as Mr. VanHook claims, arbitrarily exclude these costs. Slow orders and maintenance windows do affect track availability. However, the elimination of the slow orders and maintenance windows would not decrease

²³ RVS of VanHook, page 29.

²⁴ RVS of VanHook, page 29.

²⁵ RVS of VanHook, page 30.

BNSF's incremental maintenance costs.²⁶ Neither BNSF nor UP have provided any documented study to show how many train hours would be saved, or the value to the railroads due to increased train speed, as a result of an increase in track availability. Mr. VanHook also included {

}²⁷ {

}

I have not attempted to restate the annual maintenance costs for the "coal loop" lines and four (4) adjacent subdivisions because of the flawed and unsupported assumptions contained in Mr. VanHook's analysis. BNSF has not shown that {

} Logic dictates, and no BNSF analysis or document refutes it, that the amount of coal dust decreases as the trains get farther from the coal mines. UP's Mr. McCulloch's testimony appears to { } Mr. McCulloch states that "...the impact of coal dust is greater in proximity to the mines (as on the BNSF-UP Joint Line) and decreases with distance from the loading points".²⁸ To assume the

²⁶ { } Elsewhere, BNSF has asserted, without support, that 80% of the slow orders and maintenance windows are associated with coal dust. (see RVS of BNSF's Smith, page 3.)

²⁷ { }

²⁸ RVS of McCulloch, page 9.

entire “coal loop” and Sandhills Subdivision has the same cost function as the Orin Subdivision – one of the highest density lines in the world – is an erroneous view of maintenance costs.

However, Mr. VanHook’s assumption does serve to substantially increase the costs that BNSF claims to be incurring. In addition, Mr. VanHook chose an arbitrary value of 50 percent for the remaining adjacent subdivisions which is completely unsupported. BNSF has the actual maintenance cost and density data available to test Mr. VanHook’s assumptions. Without BNSF providing this data, the STB should not rely on the self-serving analysis presented by Mr. VanHook.

B. UP’S UNQUANTIFIED MAINTENANCE COSTS

UP disagrees with my calculation of the incremental maintenance costs related to coal dust, claiming that my “...analysis is seriously incomplete and fatally flawed.”²⁹ However, UP does not provide any quantification of any incremental maintenance costs it incurs due to coal dust. Mr. Glass’ critique of my analysis is summarized as follows:

1. Mr. Glass states that I compared the cost of spraying all PRB coal to only the maintenance costs for the Orin Subdivision and PRB segments north of Gillette;³⁰
2. Mr. Glass states that I did not include the coal dust related maintenance costs for UP line segments outside of the Orin Subdivision;³¹ and
3. Mr. Glass states that I failed to consider the impact of coal dust on the service provided for other commodities.³²

²⁹ RVS of Glass, page 3.

³⁰ RVS of Glass, page 4.

³¹ RVS of Glass, page 5.

³² RVS of Glass, page 6. Mr. Glass also contends that I failed to consider the benefit to the shippers from avoiding lost coal in transit and better utilization of the shipper’s equipment. As noted by BNSF’s Mr. VanHook, the cost of applying surfactants is { } As for the increased utilization of equipment, train cycle times are a function of many factors such as availability of crews and locomotives as well as slow orders and track availability. UP has not demonstrated that better maintenance will improve utilization.

In reality, each of Mr. Glass' criticism falls into one category, namely that I did not analyze the costs on the UP line segments. UP has the cost and maintenance data to determine its maintenance costs and develop the increased costs due to coal dust. UP has not presented any of this cost data. UP asserts that it experiences coal dust at locations far from the coal mines, but has provided no quantitative analysis related to its maintenance or costs. While UP's Mr. McCulloch opines on the impact that coal dust may have on ballast fouling, his testimony fails to identify with any specificity the amount of fouling caused solely by coal dust. To the contrary, Mr. McCulloch acknowledges that "[b]allast fouling is an eventuality on all heavy haul routes".³³ UP simply asserts that the coal dust is the cause of increased costs. Furthermore, any assertion of the increased costs to non-coal shippers fails to recognize the massive contribution to fixed costs and profits paid by coal shippers.

³³ RVS of McCulloch, page 9.

VI. COST TO APPLY SURFACTANTS

At pages 4 through 6 of my Opening Verified Statement, {

}³⁴

{

}³⁵

{

}³⁶ {

}³⁷

Mr. VanHook states that BNSF's experience with the cost of surfactants would equal

{

}³⁸

He further assumes that the "cost will come down fifteen

percent when shippers begin to comply with BNSF's coal dust standards, to a cost of about

{

}³⁹

UP's Mr. Glass' RVS also addresses the cost of spraying. Mr. Glass

contends that the {

}⁴⁰

³⁴ {

}

³⁵ RVS of VanHook, page 32.

³⁶ {

}

³⁷ {

}

³⁸ RVS of VanHook, page 31.

³⁹ RVS of VanHook, page 31.

⁴⁰ RVS of Glass, { }.

Coal Shippers requested all support from BNSF and UP regarding the cost of surfactants claimed in the testimony of Mr. VanHook and Mr. Glass. Exhibit__(TDC-5) is a copy of the letter to BNSF requesting the supporting workpapers { }⁴¹ Exhibit__(TDC-6) is a copy of the letter to UP requesting support for the cost per ton presented by Mr. Glass { }

BNSF responded to Coal Shippers' workpaper requests on May 20, 2010. The response is attached to this Rebuttal Verified Statement as Exhibit__(TDC-7). BNSF states that the requests for the support for the values of { }

}⁴² In other words, { }

Mr. VanHook presents an analysis where he attempts to show that: 1) the cost to spray would be very small compared to the delivered cost of coal; and 2) the cost to spray would be offset by { } that shippers would save due to the retention of coal in the coal cars.⁴³ Mr. VanHook's analysis is both irrelevant and incorrect.

Mr. VanHook asserts that { } of a delivered cost of \$30 per ton. { }

}⁴⁴ The ratio of the cost to spray versus the delivered cost is, in any event, irrelevant to this proceeding.⁴⁵ Mr. VanHook assumes that 500 pounds of coal per car are lost in transit, which, based on delivered cost of \$30 per ton and the 2009 number of carloadings, would result in a

⁴¹ Exhibit__(TDC-1) through Exhibit__(TDC-3) were included in my Opening Verified Statement and Exhibit__(TDC-4) was included in my Reply Verified Statement.

⁴² Exhibit__(TDC-7, page 1).

⁴³ RVS of VanHook, page 32.

⁴⁴ See Exhibit__(TDC-5) { } and BNSF's response in Exhibit__(TDC-7).

⁴⁵ Following Mr. VanHook's logic, the cost to spray is { } of the cost of transportation (\$20 per ton) in his analysis. If this cost would have no impact on the coal shippers, then theoretically, this cost would have no impact on the railroads if they absorbed the cost to spray.

savings of { } This value is incorrect for several reasons. First, Mr. Van Hook has assumed that no coal would be lost in transit. Even if surfactants were applied to the coal, some loss of coal would still occur. Second, implicit in Mr. Van Hook's calculation is the assumption that the annual coal loss due to dust is approximately { }⁴⁶ In the analysis of the incremental maintenance costs discussed above, BNSF { }, the line segment with the highest deposits of coal dust. It is totally illogical that the remainder of the BNSF and UP systems would generate { } Third, Mr. VanHook has no workpapers to support the 500 pounds per car lost in transit. { }

{ }⁴⁷ { }⁴⁸ Fourth, Mr. Van Hook does not have any support for his delivered cost for coal of \$30 per ton. In 2009, BNSF's average freight rate equaled \$13.27 per ton.⁴⁹ Accepting Mr. Van Hook's coal price of \$10 per ton, results in a delivered cost of \$23.27 per ton. This reduces the annual benefits to shippers to { }⁵⁰

On {May 10, 2010}, UP responded to Coal Shippers' request for support for the cost per ton utilized by Mr. Glass stating:
{ }

⁴⁶ { }
⁴⁷ See BNSF_Coaldust_0021534. BNSF, and UP's Mr. Glass (page 7) have also utilized a figure of 225 pounds per car for the amount of coal not lost in transit. Use of this value would result in an annual benefit of { }
⁴⁸ { }
⁴⁹ BNSF 2009 Report of Freight Commodity Statistics (Form QCS), \$3.757 billion divided by 283.1 million tons.
⁵⁰ { }

}⁵¹”

In other words, Mr. Glass has no demonstrable basis to dispute the values in the { } that I relied on and cannot support the costs that he has assumed in his analysis.

I continue to rely on the cost to apply surfactants as shown { }

Based on the annual volume { }, the estimated total cost of spraying would range between { }

⁵¹ { }

VII. UP'S ASSERTIONS REGARDING THE BNSF TARIFF

UP's Mr. Glass asserts that BNSF's proposed tariff rules would not impact UP's coal shippers. Mr. Glass explains that UP "...customers are not subject to the BNSF tariff rules at issue ..."⁵² Notwithstanding the fact that the challenged BNSF tariff items do not apply to UP's coal traffic, UP is fully supporting the BNSF tariff rules and has positioned itself to apply those rules to its own coal shippers.

While the BNSF rules are under challenge in this proceeding, Coal Shippers' concerns are justified as related to the application of the BNSF tariff rules to UP shippers. First, UP's position regarding the incremental maintenance cost due to coal dust echoes the position of BNSF. Second, UP operates on the Joint Line under BNSF's rules, which BNSF states apply to both railroads. BNSF takes the position that it has "...authority to promulgate reasonable rules governing rail operations over the PRB Joint Line".⁵³ BNSF's Mr. Bobb, in BNSF's Opening Evidence noted that "...because UP operates over the Joint Line and because coal dust emitted from trains operated by UP ...is a source of the coal dust problem, we have issued a Joint Line operating rule, applicable both to BNSF and UP, that incorporates the coal dust emissions standard...."⁵⁴ Third, {

}⁵⁵ All of these reasons

support Coal Shippers' belief that UP may institute the same program for coal dust reduction as proposed by BNSF, if BNSF's rules are approved by the STB. Accordingly, in considering the

⁵² RVS of Glass, page 4.

⁵³ BNSF Opening Evidence and Argument, pages 19-20.

⁵⁴ Opening Verified Statement of Bobb, page 6.

⁵⁵ { }

cost to coal shippers for spraying coal trains, it is appropriate to consider tons moved out of the PRB by both BNSF and UP.

VIII. UP'S ASSERTIONS REGARDING COAL RATES

UP's Mr. Glass makes several assertions regarding the rates paid by UP's coal customers. Mr. Glass rejects the "claims that rail rates for coal already cover the cost of removing coal dust at the frequency and intensity that is necessary to ensure safe and reliable service" because this claim, in Mr. Glass' opinion "...is merely an assertion with no data behind it".⁵⁶ He further asserts that while UP's contract rates for PRB coal {

}⁵⁷ Mr. Glass also raised the issue that UP has not been found to be revenue adequate by the STB and that if UP "...as a whole has not recovered its costs as a network, then coal rates cannot have paid for all of the costs associated with moving coal."⁵⁸

{

}⁵⁹

UP and BNSF are already receiving compensation in their coal rates for the current level of maintenance. Based on my experience, all long term coal transportation contracts contain rate adjustment provisions which provide for rate changes to compensate for the railroad's increased

⁵⁶ RVS of Glass, page 9.

⁵⁷ RVS of Glass, page 9.

⁵⁸ RVS of Glass, page 10.

⁵⁹ February 26, 2010 letter from Anthony J. LaRocca, Esquire to Frank J. Pergolizzi, Esquire, included as Exhibit__ (TDC-8) to this Rebuttal Verified Statement.

costs. To the extent that these adjustment provisions do not consider the railroad's productivity, they increase transportation rates faster than the changes in the costs incurred by the railroad. UP's claim that some coal rates may not cover costs over the life of a contract has not been supported by UP with any data with respect to coal transportation contracts, so Coal Shippers have no ability to evaluate the extent to which, if at all, UP actually has any contracts under which its costs exceed the rates it is receiving. Obviously, this means that the STB also has no basis to credit such a claim. As I pointed out in my RVS, BNSF and UP coal traffic is very profitable, generating contribution of \$2.18 billion in 2008.⁶⁰


Mr. Glass notes that the STB has not found the UP to be revenue adequate and, therefore, deduces that coal could not have paid for all of its costs. Beyond this unsupported inference, Mr. Glass has provided no support that coal is not paying for all of its costs. Following Mr. Glass' theory, if UP is not revenue adequate, then any commodity, or any shipper, could be claimed to be paying rates that are below "all of its costs". Coal is extremely profitable for UP. If all commodities paid rates that provided contribution at the same level as coal, then UP would be revenue adequate.

⁶⁰ See my RVS, page 6.

VERIFICATION

COMMONWEALTH OF VIRGINIA)
)
CITY OF ALEXANDRIA)

I, THOMAS D. CROWLEY, verify under penalty of perjury that I have read the foregoing Verified Statement of Thomas D. Crowley, that I know the contents thereof, and that the same are true and correct. Further, I certify that I am qualified and authorized to file this statement.


Thomas D. Crowley

Sworn to and subscribed
before me this 4th day of June, 2010

Diane R. Kavounis
Diane R. Kavounis
Notary Public for the State of Virginia

My Commission Expires: November 30, 2012
Registration Number: 7160645

Exhibits__(TDC-5) through (TDC-8)

REDACTED